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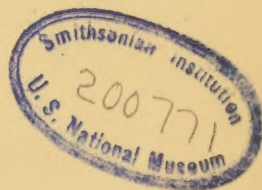
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PUBLICATION
OF THE
FIELD COLUMBIAN MUSEUM

ZOÖLOGICAL SERIES
VOL. IV. PART II.



CHICAGO, U. S. A.

1904

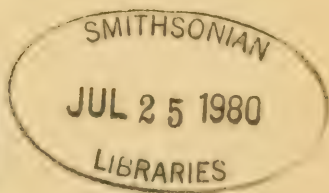
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THE
LAND AND SEA MAMMALS
OF
MIDDLE AMERICA AND THE
WEST INDIES

BY
DANIEL GIRAUD ELLIOT, F.R.S.E., ETC.
Curator of Department.

ZOÖLOGICAL SERIES
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CHICAGO, U. S. A.
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200771

Mammals

FIELD COLUMBIAN MUSEUM

PUBLICATION 95

ZOOLOGICAL SERIES *August 2, 1904* VOL. IV, PART II.
Information from Osgood
December 3, 1947.

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ERRATA.

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ILLUSTRATIONS.

Plates LIV and LV, for *Phoca geronimensis*, read *Phoca r. geronimensis*.

TEXT.

Page 543, 20th line from top, for Gallapagos, read Galapagos.

Page 619, 12th line from top, for *M. r. tropidorhynchus*, read *M. tropidorhynchus*.

CLASS MAMMALIA.

Order VII. **Carnivora. Carnivores.**

The CARNIVORA, as now restricted, comprises the flesh-eating animals of the world. They are arranged in two groups, the plantigrade, or those that walk on the sole of the foot like the Bears, and digitigrade, or those that walk on their toes like the Cats.

The Order comprises many different forms, and beside the terms given above, its members are also called Fissiped Carnivora, or those whose existence is mainly terrestrial, and Pinniped Carnivora, or those whose structure is modified for living constantly in the water, like the Walrus and Seals. The larger Terrestrial Carnivora are, *par excellence*, the preying beasts of the earth, delighting in destruction, and living a life of rapine and violence, to be usually terminated by a tragical death. Their only law is that which demands "an eye for an eye and a tooth for a tooth"; mercy and compassion are unknown virtues; their strength, cunning, and ferocity is arrayed against the ability of all other creatures, and in their natural state they stand alone on the earth, not knowing a single friend. And yet, withal, they are amply endowed with means for their own protection, and while they may not always cope successfully with the greatest of all their enemies—Man—yet even he is often vanquished by their sagacity, and in personal conflict overcome by their superior endurance and strength.

One species only among the Cats may be said to be habitually domesticated, or if that seems too strong a term, semi-domesticated, the Hunting Leopard (*Cynailurus jubatus*) which is kept in India for the chase of the Black-buck chiefly, and which has many dog-like qualities, and exhibits at times considerable affection for its keeper. But this animal is an exception, and in its natural state is as savage as any of the other Cats. While pre-eminently flesh-eaters, some members of the Order are omnivorous, like the bears, which will eat anything, and some few are partly vegetarians. The species are generally armed with more or less sharp, powerful claws, very formidable in the bears and cats, and the members of the latter family protect these from injury when not in use by withdrawing them into a sheath. The bones of the skeleton are generally slender, yet very strong, and those of the cats resemble ivory; while the teeth are large and powerful, the sectorial or true molar being composed of a

cutting knife-like blade with a varying number of cusps, and the canines are long, frequently curved, with a cutting edge, and pointed. The stomach is simple; the cæcum, when present, is small, and the vermiform appendix does not exist.

The first family, that of the Cats, is more highly specialized than any other of the Carnivora, and among its members are the most powerful of existing beasts of prey. Their attributes are various and peculiar, and some are possessed by no other creature. The quick vision, the acute hearing, the silent, stealthy, sinuous movement, the sudden spring and fearsome roar, the crushing blow of the armed paw, and attack of the scissor-acting blade-like teeth constitute altogether the most paralyzing living engine of destruction known at the present time among existing animals. Their prey consists of warm-blooded creatures which have been killed by themselves, only one species being an exception to this, an Indian Cat that lives on fish which it captures in shallow waters. Their bones are solid and like ivory, and the clavicles are set in the muscles, but are not articulated with either scapula or sternum, and thus are preserved from shock or injury when the heavy body alights on the fore paws after some tremendous spring. The face is short, and the lower jaw is incapable of lateral motion. The tongue is thickly covered with papillæ, which gives a rough surface, and in the larger species acts as a file in stripping flesh from bones. The teeth are characteristic, and the lower molar series ply within those of the upper, and cut the food as would a pair of scissors. The sectorials and canines are very large, and there is a wide diastema between the latter and the first premolar on each side of both jaws. The claws are long, sharp, and curved, terrible weapons of offense, tearing the flesh in a fearful manner, and are retractile, resting, when not in use, in a sheath that protects them from injury. The skin of cats hangs very loosely, and parts of it are capable of being drawn half round the body, a wise provision, as it thus yields to the stroke of the sharp claws, and they can get no hold, and lacerations, consequently, rarely occur. The pelage is of many colors, often brilliant in hues, and decorated with various patterns, and frequently of a soft, even, velvety texture, and this beautiful covering, with the graceful, silent movements, as if performed by some imaginary spirit of a dream, make these animals appear to the eye among the most attractive of all quadrupeds.

Fam. I. **Felidæ. Cats.**

D. G. Elliot, *Monograph of the Felidæ*, Folio, London, 1878-83
St. G. Mivart, *The Cat*, London, 1881.

Claws retractile, long, sharp, curved, compressed; feet digitigrade, five toes on fore feet, four on hind; soles hairy; pads naked; tongue covered with sharp, hornlike papillæ, pointing backward; only one true molar on each side above and below, and two inferior premolars; upper carnassial (posterior premolar) very large, with a trilobed blade, and a small inner tubercle with separate root; lower carnassial (true molar) a large, compressed, sharp blade with two subequal lobes, without inner cusp; canines long, curved, acute, edges trenchant; skull short, broad; facial portion short; zygomata very wide, arched; bullæ large, smooth; clavicles not articulating with scapulæ or sternum.

85. Felis.

$$I. \frac{3-3}{3-3}; C. \frac{1-1}{1-1}; P. \frac{3-3}{2-2}; M. \frac{1-1}{1-1} = 30.$$

Felis Linn., Syst. Nat., 1, 1758, p. 41; 1, 1766, p. 60. Type *Felis catus* Linnæus.

Linx (sic) Frisch. Das Natur-syst. vierfüß. Thiere, in Tabellen, 12 Tab. Gen., 1775.

Lynx Kerr, Anim. Kingd. Syst. Catal., between pp. 32-33, 1792, desc. p. 155, Rafin., Am. Month. Mag., 1, 1817, p. 437.

Lynchus Jard., Nat. Libr. Mamm., 11, 1834, pp. 274-275.

Puma Jard., Nat. Libr., Mamm., 11, 1834, p. 266.

Ŷaguirius Servertz., Rev. Mag. Zoöl., 2me Sér., x, 1858, p. 386-390

Lynchailurus Servertz., Rev. Mag. Zoöl., 2me Sér., x, 1858, p. 386-390.

Noctifelis Servertz., Rev. Mag. Zoöl., 2me Sér., x, 1858, p. 386-390.

Oncifelis Servertz., Rev. Mag. Zoöl., 2me Sér., x, 1858, p. 386-390.

Herpailurus Severtz., Rev. Mag. Zoöl., 2me Sér., x, 1858, p. 385.

Leopardus Gray, Proc. Zoöl. Soc., 1867, p. 263.

Margay Gray, Proc. Zoöl. Soc., 1867, p. 271.

Pardalis Gray, Proc. Zoöl. Soc., 1867, p. 272.

Cervaria Gray, Proc. Zoöl. Soc., 1867, p. 276.

Tail long, exceeding half the length of the body without head and neck; anterior premolar small.

KEY TO THE SUBGENERA.

- | | | |
|---|------------------|------|
| A. Tail about the length of the body without head. | | PAGE |
| a. Adults and young spotted or striped. | <i>Leopardus</i> | 444 |
| B. Tail about half the length of body without head. | | |
| a. Adults unspotted, young spotted. | <i>Felis</i> | 454 |
| C. Tail less than half the length of body without head. | | |
| a. Adults and young spotted. | <i>Lynx</i> | 456 |

A. Leopardus.

Tail about length of body; posterior portion of premaxillæ very narrow and lengthened.

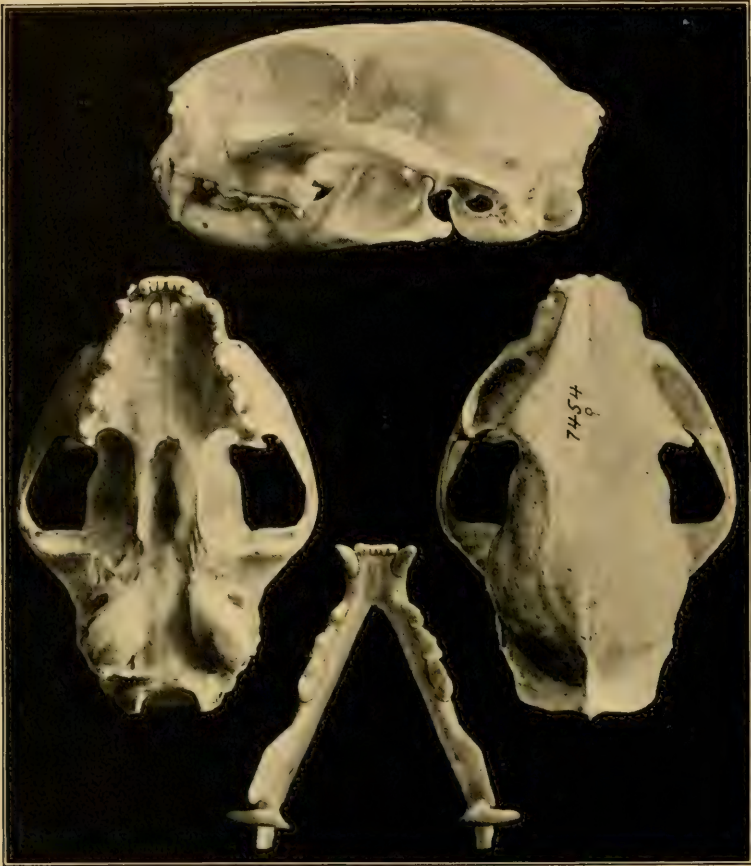


FIG. 83. FELIS JAGUARONDI.
No. 7454 Field Columbian Mus. Coll. $\frac{2}{3}$ nat. size.

KEY TO SPECIES AND SUBSPECIES.

A. Adults and young spotted.	PAGE
a. Spots large, above clay color, variable. <i>F. o. centralis</i>	446
b. Spots small.	
a.' Above ochraceous buff. <i>F. o. hernandezi</i>	446
b.' Above tawny ochraceous. <i>F. o. goldmani</i>	447
B. Adults and young irregularly striped.	

a. Above rufous, marked with black; color very variable.....	<i>F. pardalis</i>	447
b. Above tawny, marked with black; color very variable.....	<i>F. p. mearnsi</i>	448
c. Above brownish black.....	<i>F. carrikeri</i>	448
d. Above pale rufous brown.....	<i>F. tigrina</i>	449
e. Above pale drab gray.....	<i>F. glaucula</i>	450
f. Above dark clay color.....	<i>F. p. oncella</i>	450
C. Adults and young unspotted.		
a. Above grizzled brownish gray, variable.....	<i>F. jaguarondi</i>	451
b. Above smoky gray.....	<i>F. j. cacomitli</i>	451
c. Above pale grizzled fawn.....	<i>F. j. tolteca</i>	452
d. Above dusky gray.....	<i>F. panamensis</i>	452
e. Above brownish red.....	<i>F. cyra</i>	453
f. Above rufous.....	<i>F. c. apache</i>	453
g. Above —— (?) Skull only known.....	<i>F. fossata</i>	453



FIG. LIX. FELIX ONCA. JAGUAR. FROM ELLIOT'S MON. FELIDÆ.
1. *Felis onca*; 2. *Felis o. hernandezi*. Ex type Brit. Mus.

**onca centralis* (*Felis*), Mearns, Proc. Biol. Soc. Wash., XIV, 1901, p. 139.

COSTA RICA JAGUAR. *Tigre* in Spanish America for all Jaguars.

Type locality. Talamanca, Costa Rica.

Geogr. Distr. Costa Rica north to Honduras, Central America.

Genl. Char. Smallest of the Jaguars; dentition weak; colors intense.

Color. Clay color with a median chain of black spots, bordered on each side by five longitudinal rows of black rosettes; these lateral rosettes increase in size as they go toward the belly, and contain from one to five small black spots. Crown and sides of neck tawny, covered with black spots or rosettes; black spot on upper and lower lip; ears outside black with tawny spot in middle, inner side clay color, tawny on margin; limbs on outer side clay color blotched with black; under parts buffy white blotched with black; tail clay color above, heavily spotted and banded with black, beneath whitish blotched with black; muzzle clay color; claws horn color.

Measurements. Total length, 1800; tail, 575; hind foot, 220; ear from crown, 60; (skin.) Skull: occipito-nasal length, 240; Hensel, 197; zygomatic width, 153; width of antorbital processes, 75; median length of nasals, 64; palatal length from alveoli of incisors, 95; length of basi-occipital, 36; width between bullæ posteriorly, 40; length of sectorial, 26; length of lower tooth row, 53; lower last molar, 20. (Type.)

onca hernandezi (*Felis*), Gray, Proc. Zool. Soc., 1857, p. 278.

hernandezi (*Felis*), Elliot, Mon. Felidæ, pl. v, *F. onca*, rear figure.

HERNANDEZ'S JAGUAR.

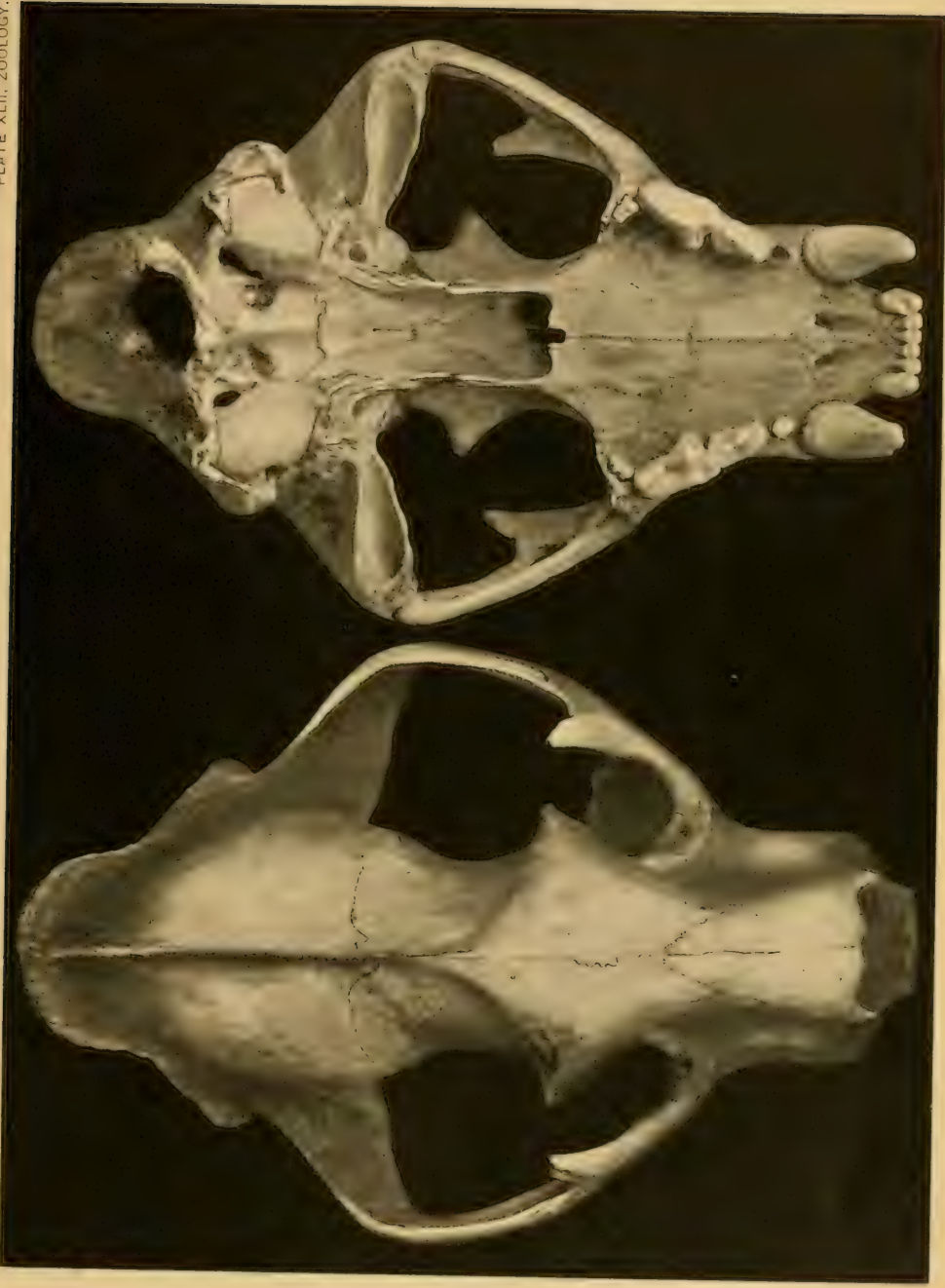
Type locality. Mazatlan, State of Sinaloa, Mexico.

Geogr. Distr. Apparently western Mexico, from State of Colima north to San Blas.

Genl. Char. Color pale; black markings small; rosettes confined to upper portion of middle dorsal region.

Color. Ochraceous buff, covered with scattered single black spots, except behind the shoulders, where they are gathered into rosettes; ears, as in other jaguars, black with buff center externally; under parts buffy white banded with elongate black spots; tail above ochraceous buff, beneath grayish white striped and banded with black.

*The Jaguars, like the species of most genera, have been "split" into various races of the typical form, some of which are here given. The wisdom of this method, carried as it often is to great extremes, is very questionable, especially with animals like these cats, that vary so greatly, even among individuals from the same locality, that it is practically impossible to find two alike. It is doubtful, as knowledge of these animals increases, if many of the races can maintain any kind of a distinctive rank.



FELIS O. CENTRALIS.

No. 64992 U. S. Nat. Mus. ♂ imt. size.



FELIS O. CENTRALIS.

No. 61192 U. S. Nat. Mus. ♂ nat. size.

Measurements. Total length, 1900; tail, 650 (skin). Skull: basal length, 181; zygomatic breadth, 156-159; mastoid breadth, 95; interorbital breadth, 45-46; width of postorbital processes, 70-72; postorbital breadth, 45-50; median length of nasals, 53-55; greatest breadth of nasals, 36-37; foramen magnum to posterior margin of palate, 90; posterior margin of palate to middle incisor, 87-91; length of upper tooth row, 71-72; crown of upper carnassial, 25.8×13 ; length of mandible, 150-154; height of mandible, 67-72.

onea goldmani (Felis), Mearns, Proc. Biol. Soc. Wash., XIV, 1901, p. 142.

GOLDMAN'S JAGUAR.

Type locality. Yohatlan, State of Campeche, Mexico.

Geogr. Distr. Unknown.

Genl. Char. Similar to *F. o. hernandezi*, but of a deeper color and larger black markings.

Color. Above tawny ochraceous heavily spotted with black, a chain of black spots forming nearly a complete dorsal stripe; rosettes on dorsal area much larger in size; under parts buffy white, banded with elongate black spots; tail mainly black above, this hue predominating on under side also; ears black with tawny central spot, creamy buff within.

Measurements. Total length, 1910; tail, 670 (skin). Skull: Hensel, 211-227; zygomatic breadth, 178-180; mastoid breadth, 111-113; interorbital constriction, 49-50; width of postorbital processes, 74-75; median length of nasals, 62-67; greatest breadth of nasals, 43-48; length of premolar series, 52-54; crown of upper carnassial, 27×14 ; length of interpterygoid fossa, 35-36.

455. pardalis (Felis), Linn., Syst. Nat., I, 1758, p. 42; I, 1766, p. 62. Elliot Mon. Felidae, pl. XVIII, text; *Id.* Syn. N. Am. Mamm., 1901, p. 294.

**limitis* Mearns, Proc. Biol. Soc. Wash., XIV, 1901, p. 146.

*This seems to be a pale individual of *F. pardalis*, such as is not infrequently seen in a series of specimens from a single locality. Color in this most variable species has but little specific value. The type in the U. S. National Museum, Washington, has been examined. Dr. Mearns states that the pattern of this form is never exactly the same on any two specimens. Some twenty years ago, when writing in the Monograph of the Felidae on the Ocelots, after an exhaustive examination of all the specimens then contained in the great European Museums, as well as in those of this country, I was constrained to say, regarding the coloration and patterns of the Ocelot, that, "to vary from each other in the hue and arrangement of the spots and stripes of their coats seems to be one of the chief efforts of the existence of these cats, and as if not content with differing from his fellows, an Ocelot usually succeeds in exhibiting a distinct pattern on each of his sides, so that he may be said to differ from himself." It will be, therefore, extremely easy to split the *pardalis* group into any number of so-called subspecies, or even species, but very difficult to make them generally recognizable by Mammalogists. The type of *F. limitis*, so far as its color is concerned, does not resemble the *F. albescens*. Pucheran.

OCELOT. *Manigordo* in Costa Rica.

Type locality. Mexico.

Geogr. Distr. Southern Texas to Mexico, and southward to Buenos Ayres east of the Andes. Boquete, Chiriqui, Central America. (Bangs.)

Genl. Char. Size less than that of the lynx; tail less than half the length of head and body; color markings very irregular, and body color very variable.

Color. Upper parts rufous, marked with black lines and spots, some of the latter with rufous centers; flanks and loins yellowish white, striped with rufous margined with black; legs spotted with black on light buff; feet buffy white; cheeks crossed by two black lines; chin, throat, breast, and belly white, the last two spotted with black; tail dark buff, banded and spotted with black, tip blackish. (Typical style.)

Measurements. Total length about 970; tail vertebræ, 347; Skull of *F. limitis*, type, Hensel, 114; zygomatic breadth, 93; width of bullæ, 17; length of upper tooth row, 40; crown of carnassial, 15.8×7.8 .

†*a.—mearnsi* Allen, Bull. Am. Mus. Nat. Hist., 1904, p. 71.

costaricensis. Mearns, Proc. U. S. Nat. Mus., 1902, p. 245. (nec Merr.)

COSTA RICA OCELOT.

Type locality. Talamanca, Costa Rica.

Genl. Char. Size large; ground color tawny; pattern of coloring like that of *F. pardalis*.

Color. Ground color of upper parts russet or tawny; five black stripes on neck above; a median dorsal black stripe, with a row of black spots on each side; tail with numerous black cross bars both above and beneath; a black stripe beneath head and one on chest; under parts cream buff with the usual black spots; ears black, with the gray patch as seen in all of these cats.

Measurements. Total length, 1050; tail, 280; hind foot, 162. (skin.) Skull: Hensel, 134; zygomatic breadth, 108; Male. Female: Hensel, 112; zygomatic breadth, 92.

456. **carrikeri* (*Felis*) Allen, Bull. Am. Mus. Nat. Hist., 1904, p. 47.

†This would seem to be an individual of the *F. pardalis* form with colors slightly deepened, a hue often seen in specimens of this species irrespective of locality.

*Evidently a melanistic individual, probably of *F. pardalis*. The total length equals that species, but the skull and tail have smaller measurements. This may be merely an individual peculiarity.

CARRIKER'S OCELOT.

Type locality. Pozo Azul, Pirris Province, Costa Rica.

Genl. Char. Size small; tail short.

Color. Nose to end of tail brownish black; sides lighter and more brownish; ventral surface chocolate brown; outer side of limbs dark chocolate brown indistinctly clouded with blackish brown; inner side of limbs like ventral surface indistinctly blotched with darker spots; ears blackish brown; lips and cheeks blackish; tail above uniform brownish black, sides and beneath lighter, slightly clouded with a darker color.

Measurements. Total length, 970; tail vertebræ, 276; hind foot, 101. Skull: total length, 86; Hensel, 73; zygomatic breadth, 55; interorbital constriction, 16; intertemporal width, 28; middle of brain-case above meatus, 38; length of nasals, 18; anterior width of nasals, 11; bullæ, 18×10; front of canine to posterior border of carnassial, 30.5; length of upper carnassial, 19; length of lower carnassial, 7.5; length of mandible, 55; height at condyle, 11.5; at coronoid, 21.5.

457. *tigrina* Erxl., Syst. Regn. Anim., 1, 1777, p. 517. Elliot, Mon.

Felidæ, pl. xix.

mitis F. Cuv., Hist. Nat. Mamm., 11, 1820, pl. 137.

macroura Max., Beitr. Naturg. Bras., 11, 1826, p. 371.

chati Griff., Anim. King., 11, 1827, p. 479.

brasiliensis F. Cuv., Hist. Nat. Mamm., 11, 1820, pl. 139.

elegans Less., Cent. Zoöl., 1830, p. 69, pl. 21.

THE MARGAY. *Cauzel* in Costa Rica.

Type locality. Unknown. "South America."

Geogr. Distr. Honduras to Paraguay.

Genl. Char. Nasals broad, narrowing rapidly posteriorly; audital bullæ large, swollen; infraorbital foramen oblong; canines moderate.

Color. Very variable. General color light rufous brown; four narrow brownish black lines, two from between, and two from the corner of the eyes, pass over the top of the head to the base of the neck, where they become broader and black; a line of white between the nose and eyes; two narrow brown lines cross the cheek from the eye and meet another irregular dark brown line passing across the side of the throat under the jaw. Cheek, throat, breast, and belly have the ground color white; the entire body, back, sides, and belly thickly covered with round brownish black spots, forming lines on the back; the breast is crossed by four or five irregular brownish black lines; legs spotted like the back, the spots reaching nearly to the feet on the fore legs, but only to the heels on the hind ones; tail long, covered with black spots like those of the body, and inclining

to rings near the tip; the ground color rufous like that of body. Back of ears rufous, black on outer edge. (From Mon. Felidæ, ex Spec. in Brit. Museum, representing typical style.) Other examples are gray, yellowish brown, or reddish buff, and the patterns have endless variety.

Measurements. Total length, about 890; tail, 280.

458. glaucula (*Felis*), Thomas, Ann. Mag. Nat. Hist., 7th Ser., XII, 1903, p. 235.

SMALL SPOTTED CAT.

Type locality. Beltran, State of Jalisco, Mexico.

Color. General color pale drab gray; linear black markings narrow, and inclosing on the sides elongate spaces; central pale line on back, with a double series of broken black lines on each side; on shoulders and hips the markings form rosettes with deep black borders; central spaces of rosettes gray, darker than the ground color; black line across lower part of jaw, and one across chest; belly spotted with black; limbs buffy gray on outer side, white on inner, and spotted to feet; tail with 11 or 12 black rings.

Measurements. Total length, 1010 (overstretched); tail, 410; hind foot, 108; ear, 48. Skull: greatest length, 94.5; basal line, 82; zygomatic breadth, 63; median length of nasals, 16.5; interorbital breadth, 18; across postorbital processes, 49; interorbital constriction, 30.5; breadth across frontals, 38; across parietals, 43; palatal length, 35; length of bullæ, 20.5.*

†*pardinoides onella* (*Felis*), Thomas, Ann. Mag. Nat. Hist., 7th Ser., XII, 1903, p. 237.

OUNCE-LIKE CAT.

Type locality. Volcan de Irazú, Costa Rica.

*With the exception that the general ground color is said to be gray instead of fulvous or tawny (also two distinctive hues), there is nothing in Mr. Thomas's description (l. c.), from which the above was taken, to enable any one to distinguish this form from *F. tigrina*, and this light color may be, as it is in other cases, an individual peculiarity. It is to be regretted that new names should be given to the spotted cats, whose synonymy is already so voluminous, until at least some agreement can be reached as to what forms the majority of these appellations should be restricted, for new names with perplexing descriptions only serve to increase the confusion that may already exist.

†This animal is compared with *F. pardinoides* Gray, which has not been satisfactorily separated from *F. geoffroyi*. It is reasonable to expect that this should be done before a subspecies of *F. pardinoides* is created. It would be difficult to accurately determine that any specimen was the same as Mr. Thomas's species without comparison with the type, as there are but slight specific characters indicated in the description, unless a "richer and deeper ground color" may be so considered, but which is a comparative distinction of questionable value.

Color. Ground color dark clay color; usual black lines on head and nape, but median nectral line not present; black line on lower back flanked by rosettes; chin dull whitish; under surface brownish clay color, as are also the feet; tail with broad black rings above, clay color beneath, with indistinct black rings; tip black.

Measurements. Total length, 795; tail, 290; hind foot, 105; ear, 39. No skull preserved.

459. jaguarondi (*Felis*), Fisch., Zoogn., 1814, p. 228. Elliot, Mon.

Felidæ, pl. XIII. *Id.* Syn. N. Am. Mamm., 1901, p. 295.

JAGUARONDI. *Leon monero*, *Leon miquero*, in Costa Rica.

Type locality. Paraguay.

Geogr. Distr. Rio Grande, Texas, southward to Paraguay, east of Andes.

Genl. Char. Body elongate; legs short; tail as long as body without head.

Color. General color grizzled brownish gray; hairs annulated and black-tipped; tail like body; some specimens black with rufous tinge, tips of hairs white.

Measurements. Total length, 678; tail vertebræ, 365. Skull: occipito-nasal length, 96.5; Hensel, 86; zygomatic width, 64; inter-orbital constriction, 29; at posterior processes, 44; mastoid width, 39; median length of nasals, 19; length of upper tooth row, 20; length of mandible, 55; height at coronoid process, 28; length of lower tooth row, 22.

a.—**cacomitli* Berlandier in Baird, Rep. U. S. & Mex. Bound. Surv., 1857, II, Mamm., p. 12.

GRAY JAGUARONDI.

Type locality. Matamoros, State of Tamaulipas, Mexico.

Genl. Char. Color gray.

Color. Summer Pelage. Nearly uniform smoky gray, or pepper-and-salt gray with under fur whitish gray, the over hairs ringed with white, buff, and black, and tipped with black; under parts paler; light buffy gray bordering the blackish orbital ring, and on chin and throat; a narrow blackish line between eyes, and another between ears; tail beneath whitish smoke gray.

Winter Pelage. Darker, with more black on back; otherwise similar to the summer coat.

Measurements. Total length, 1060; tail vertebræ, 480; hind foot, 140; ear above crown, 40. Skull: Hensel, 95; zygomatic breadth, 70;

*A gray phase of *F. jaguarondi*, probably an individual peculiarity, and no doubt found among members of the same litter, as is witnessed among the young of screech owls, *Otus asio*, in the same nest. (See the Auk, 1903, pp. 272-76 for use of genus *Otus*.)

interorbital constriction, 20; intertemporal breadth, 30; breadth of braincase above meatus, 46; palatal length, 40.7; breadth between outer corners of carnassials, 38.7; breadth of posterior nasal fossa, 14; front of canine to back of carnassial, 28.5; length of upper carnassial, 12.3; length of lower carnassial, 8.8.

b.—**tolteca* (*Felis*), Thomas, Ann. Mag. Nat. Hist., 7th Ser., 1, 1898, p. 41.

SINALOA JAGUARONDI.

Type locality. Tatemaes, State of Sinaloa, Mexico.

Geogr. Distr. State of Sinaloa, Mexico; range unknown.

Genl. Char. Similar in size to *F. jaguarondi*, but color grizzled fawn instead of blackish gray or reddish of the typical form. Skull comparatively different.

Color. General color above pale grizzled fawn, grayer on head, neck, and limbs; tail grizzled fawn above, rufous fawn beneath; under parts whitish fawn; base of fur brownish gray.

Measurements. Total length, 1030; tail, 460; hind foot, 138; ear, 37. Skull: Hensel, 82; zygomatic breadth, 64; interorbital constriction, 18; intertemporal width, 33.5; breadth of braincase above auditory meatus, 43; palatal length, 36; width between outer corners of carnassials, 38.7; width of posterior nasal fossa, 14; front of canine to back of carnassial, 28.7; length of upper carnassial, 11.3; of lower carnassial, 9.

460. †*panamensis* (*Felis*), Allen, Bull. Am. Mus. Nat. Hist., 1904, p. 71.

BOQUERON JAGUARONDI.

Type locality. Boqueron, Chiriqui, Panama.

Color. Above dusky gray; head, ears, nape, and sides of neck lighter, rusty brownish gray varied with black; top of shoulders and posterior third of medium dorsal region black, irregularly varied with white-tipped hairs; sides of front of limbs dark gray; inner side blackish; fore neck and throat rusty brown; ventral surface dark gray; feet blackish; tail black above, sides and beneath lighter; under fur gray brown.

Measurements. Total length, 985; tail vertebræ, 390; hind foot, 128; ear, 40. Skull: total length, 96; Hensel, 80; zygomatic width, 62; interorbital constriction, 15.5; width of braincase, 46; length of

*This should be compared with the previous subspecies. Difference of sex might be responsible for different body and cranial dimensions. The coloring of the two individuals is apparently similar, merely a gray phase of *F. jaguarondi*.

†Should be compared with *F. j. cacomilli* and *F. j. tolteca*. Apparently an individual slight variation in color so common in examples of *F. jaguarondi*.

nasals, 24; palatal length, 33; bullæ, 18×12 ; length of upper tooth row from front of canine, 30; length of upper carnassial, 12.5; length of lower carnassial, 9.7; length of mandible, 60; height of condyle, 13; at coronoid process, 27.

461. eyra (*Felis*), Fisch., Zoogn., 1814, p. 228. Elliot, Mon. Felidae, pl. XIV; *Id.* Syn. N. Am. Mamm., 1901, p. 295.

THE EYRA. *Apache, Onza* in Mexico.

Type locality. Paraguay.

Geogr. Distr. Brownsville, Texas, south to Paraguay, east of the Andes.

Genl. Char. Body long and slender; legs short; tail very long.

Color. Rich brownish red; darkest on the back, lightest on belly; tail same color.

Measurements. Total length, 670; tail vertebræ, 230.

a.—apache (*Felis*), Mearns, Proc. Biol. Soc. Wash., XIV, 1901, p. 150.

eyra. Baird, Rep. U. S. & Mex. Bound. Surv., Mamm., 1857, p. 88, pl. LXII, fig. 1.

THE TAMAULIPAS EYRA.

Type locality. Rio Grande del Norte, State of Tamaulipas, Mexico.

Genl. Char. "Size of common house cat; body long and slender; head small; ears short, without tufts; tail long. Skull: no frontal fossa; marked lateral constriction of the audital bullæ; posterior narial fossa narrow; teeth small.

Color. Entirely rufous, including tail; no spots visible.

Measurements. Skull: "basilar length of Hensel, 76; zygomatic breadth, 60; least interorbital breadth, 19; intertemporal breadth, 32; breadth of braincase above auditory meatus, 41; palate, length from henselion to posterior edge, excluding median notch, 32.2; greatest diameter of orbit, 26; greatest length of nasal bone, 20; breadth of nasal bones opposite end of nasal processes of frontals, 8.5; anterior narial orifice, 12×11 ; breadth of jugal, 7; audital bullæ, 18×10 ; breadth between outer corners of carnassials, 33; breadth of posterior narial fossa, 12; front of upper canine to back of carnassial, 25; length of upper carnassial, 11; length of lower carnassial, 8.8." (Mearns, l. c.)

462. fossata (*Felis*), Mearns, Proc. Biol. Soc. Wash., XIV, 1901, p. 150.

YUCATAN EYRA.

Type locality. Merida, Yucatan.

Genl. Char. Skull alone known. "Skull narrow, its greatest diameters, 91×60 mm.; convex posteriorly, flattened supraorbit-

ally, with marked declination forward from middle of nasals, interfrontal region with a deep fossa, V-shaped on section, 8 mm. in length, between the anterior extremity of the interfrontal suture and the nasal bones, which latter are similarly infolded, continuing the fossa forward to the extremity of the nasals as a groove which gradually decreases in depth towards their extremity; orbit relatively small; nasal bones narrow, elongate at sides, pointed posteriorly, where they are bent downward to form the anterior portion of the frontal fossa; anterior narial opening high and narrow; infra-orbital foramen single and round; interorbital region narrow; jugal broad; posterior narial fossa wide, with a scarcely perceptible post-palatal notch; audital bullæ elongate, high, pointed anteriorly, scarcely constricted laterally; sagittal and occipital crests moderately developed; dentition heavy as compared with *Felis apache*."

Measurements. "Basilar length of Hensel, 78; zygomatic breadth, 60; least interorbital breadth, 16; intertemporal breadth, 30; breadth of braincase above auditory meatus, 42; palate, length from hensation to posterior edge, excluding median notch, 33.7; greatest diameter of orbit, 23; greatest length of nasal bone, 23; breadth of nasal bones opposite end of nasal processes of frontals, 7; anterior narial orifice, 14×12 ; breadth of jugal, 10; audital bulla, 20×12 ; breadth between outer corner of carnassials, 37.2; breadth of posterior nasal fossa, 13; front of upper canine to back of carnassial, 27.5; length of upper carnassial, 12.2; length of lower carnassial, 9.4." (Mearns, l. c.)*

B. Felis.

Tail half the length of body without head. Adults without spots.

†*concolor oregonensis* (*Felix*!), Rafin., Atlantic Journ., I, 1832, No. 2, p. 62.

hippolestes Merr., Proc. Biol. Soc. Wash., XI, 1897, p. 219.

olympus Merr., Proc. Biol. Soc. Wash., XI, 1897, p. 220.

hippolestes aztecus Merr., Proc. Wash. Acad. Scien., III, 1901, p. 592.

NORTHWESTERN PUMA.

Type locality. Northwest coast.

*It would be more satisfactory if, in a genus where there is so much variation in the species, the material by which this form has been differentiated could have been more ample.

†Dr. Merriam has described at various times sundry species and subspecies of Puma, basing his distinctive characters upon size, color, and certain differences in the skull. As regards size, that is hardly worth considering as a specific character; for all cats vary so greatly in their dimensions, even from the same locality, that no dependence can be placed upon measurements; and sex and age, even among adults, have much influence on the size of an animal



FELIS C. OREGONENSIS.

No. 9888 Field Columbian Mus. Coll. $\frac{2}{3}$ nat. size



FELIS C. OREGONENSIS.
No. 9888 Field Columbian Mus. Coll. $\frac{2}{3}$ nat. size.



FELIS C. OREGONENSIS.
No. 9888 Field Columbian Mus. Coll. $\frac{2}{3}$ nat. size.

Geogr. Distr. West coast of North America, east to Rocky Mountains, south into northern Mexico.

Genl. Char. Size variable; tail long; color variable.

Color. Upper parts and sides varying from dark to pale rufous brown, occasionally almost of a gray shade, darkest on dorsal region; tail above like back, with a black tip, beneath either white on basal portion, or all gray or grayish white; face with black patch on upper lip on each side of nose; top of head and nose darker than back; upper lip and throat white; belly white or grayish white, often tinged with rufous; ears behind black with a paler spot on center; front part of legs similar to body; hind part paler, often nearly white.

Measurements. Total length, 2000-2600, often less than 2000; tail vertebræ, 750-900; hind foot, 260-270. Skull: adults, occipito-nasal length, 175-202; Hensel, 144-167; zygomatic width, 124-142; interorbital constriction, 34-41.5; across postorbital processes, 63-75;

without considering other causes. Color in these animals is equally unsatisfactory; for whenever many Puma skins from any locality are compared, their color will be seen to be mostly a matter of individual or seasonal variation. As to skull dimensions and characters, none have yet been given, so far as I have seen, that are *permanent*, by which I mean characters that are to be met with in ALL skulls from even the same locality. This being so, they cannot be depended upon or maintained; for the same characters may be, and indeed are, found in skulls of Pumas killed many miles apart and which rejoice in different names. Dr. Merriam has separated the Puma from Colonia Garcia in the State of Chihuahua, Mexico, as a distinct form under the name of *F. hipolestes aztecus*, giving such characters as "narrow interorbital region; frontals elevated, arched; sagittal crest less highly developed; bullæ variable; tail without white beneath, and a dull grayish fulvous color on the upper parts." There are in the collection of the Field Columbian Museum five topotypes of this animal, varying in size and color, from one as large as a big northwest specimen to a moderately sized individual, and in color from a rather pale hue to one indistinguishable from the Pumas of Montana and British Columbia, with which a comparison has been made, and also exhibiting tails *with and without white beneath*. The skulls do not average narrower in the interorbital region, in fact some are wider than those of their northern relatives, the frontals are neither more elevated nor arched, the sagittal crest is present in all, and varies in development, as will be the case in all cat skulls which have it at all. The bullæ vary greatly in size in all, more so perhaps in the Chihuahua specimens than in the others, but there are more of them than from any other particular locality, so this fact cannot be definitely determined, but the variation among the Mexican specimens is so great as to prove that for form or size the dimensions of the bullæ, in these examples at least, are worthless as specific characters. "Total length" depends, as a rule, mainly upon the length of tail, and this member differs greatly in that respect in this family, the caudal vertebræ in some individuals of the same species and from the same locality often varying in number. This I have known to be the case among lions and other big cats. After a very careful investigation and comparison, therefore, of these Colonia Garcia specimens with those from the north and northwestern United States and British Columbia, I do not find a single intelligible character by which they can be separated, and have placed *F. h. aztecus* as a synonym of *F. oregonensis* Rafin, expressing at the same time very great doubts if this northwestern animal has any claims to be considered distinct from the Pumas inhabiting the other portions of the United States, no dependable characters having yet been suggested by which the animals of one section can be accurately and definitely distinguished at all times from those of another.

median length of nasals, 37.5-43; palatal length, 67-81.5; length of upper canine anteriorly, 25-31; length of upper carnassial, alveolar border, 18.5-21; length of upper molar series, alveolar border, 33.5-37; length of lower canine anteriorly, 22-27; alveolar length of lower carnassial, 12.5-13; alveolar length of lower molar series, 40-43; length of mandible, angle to symphysis, 121-134; height at coronoid process, 57-66.

**bangsi costaricensis* (*Felis*), Merr., Proc. Acad. Nat. Scien. Wash., 1901, p. 596.

CENTRAL AMERICAN PUMA.

Type locality. Boquete, Chiriqui, Panama.

Geogr. Distr. Unknown.

Genl. Char. Belly red like the sides.

Color. "Similar to *F. bangsi* of South America (ferrugineous), but darker and redder, particularly on the belly, which is red like the sides, with only an indistinct narrow whitish line down the middle, barely connecting the whitish pectoral and inguinal areas; fur between foot pads black."

Measurements. Total length, 1680; tail vertebræ, 680; hind foot, 220; ear, 75." (Merr., l. c.)

C. Lynx.

Tail short, less than half the length of body without head; anterior premolar wanting.

KEY TO THE SPECIES AND SUBSPECIES.

A. Tail less than half the length of body.

	PAGE
a. Fur spotted in adults and young.	
a.' Above pale rufous..... <i>F. r. escuinapæ</i>	456
b.' Above chestnut brown; variable..... <i>F. r. texensis</i>	458
c.' Above grizzled pale yellowish brown..... <i>F. r. eremica</i>	458
d.' Above reddish brown, gray, and black. <i>F. r. californica</i>	458
e.' Above gray, suffused with buff..... <i>F. r. baileyi</i>	459
f.' Above pale rufous gray..... <i>F. peninsularis</i>	460

rufa escuinapæ (*Lynx*), Allen, Bull. Am. Mus. Nat. Hist., 1903, p. 614.

ESCUINAPA LYNX.

Type locality. Escuinapa, State of Sinaloa, Mexico.

Genl. Char. Similar to *F. r. californica* and *F. r. texensis*, but smaller, more spotted, and streaked with black, and without black soles.

*This should be compared with the Mexican Puma, as the under parts often have a red or reddish tinge in these animals irrespective of locality.



FIG. 84. FELIS R. BAILEYI.

No. 7620 Field Columbian Mus. Coll. $\frac{2}{3}$ nat. size.

Color. Above pale rufous varied with gray; lighter on sides; middle of dorsal region striped and spotted with black; sides with larger spots of brownish black; two narrow median dorsal black bands; top of head streaked and spotted with black; front and sides of head mixed gray and pale rufous; orbital ring grayish white; upper lip with black mark; sides of neck with black stripes; fore limbs pale rufous blotched with black; inner sides whitish with half-rings and spots of black; hind limbs similar; ventral surface white;

rufous band on chest and abdomen slightly suffused with buff, and the entire under parts blotched with black; tail above like back, with black apical half-ring and several paler half-rings of blackish brown; middle of tail below white, and white tip; ear black, with whitish gray median patch.

Measurements. Total length, .805; tail vertebræ, 117; hind foot, 160; ear from notch, 55. Skull: total length, 115; Hensel, 94; palatal length, 41; zygomatic breadth, 78; interorbital constriction, 22; breadth across postorbital processes, 52; mastoid breadth, 52.3; breadth between outer corners of upper carnassials, 45.3; length of upper carnassials, 14.6.

rufa texensis (*Felis*), Allen, Bull. Am. Mus. Nat. Hist., 1895, p. 188.

Elliot, Syn. N. Am. Mamm., Suppl., 1901, p. 506 (note).

rufa maculata Vig. & Horsf., Zool. Journ., IV, 1829, p. 381. (nec

Kerr.) Elliot, Syn. N. Am. Mamm., 1901, p. 296, as *maculata*.

WILD CAT. *Gato montes* in Mexico for all Lynxes.

Type locality. Mexico.

Geogr. Distr. Mexican boundary line into Texas and California.

Genl. Char. Fur coarse; distinct spots on back and sides.

Color. Above chestnut brown; darkest on back, with rather indistinct spots, also on outer side of legs; under parts white, with large black spots; inside of thighs banded with black and chestnut; tail beneath white, above tip is black.

Measurements. Total length, about 900; tail vertebræ, 126.

rufa cremica (*Lynx*), Mearns, Proc. U. S. Nat. Mus., XX, 1897, p. 457.

Elliot, Syn. N. Am. Mamm., 1901, p. 298.

DESERT LYNX.

Type locality. New River, near Laguna Station, Colorado Desert, San Diego County, California.

Geogr. Distr. Eastern and Western Desert Tracts on the Mexican Line; probably in States of Sonora and Chihuahua, Mexico.

Color. Above grizzled pale yellowish brown, spotted and striped with brown and black; legs ochraceous buff, mixed with grayish; under parts white, and with inner side of limbs spotted or banded with black; flanks and outer side of limbs spotted with yellowish brown; tail reddish brown above, white below, subterminal spot of black, rest barred with black; ears as usual.

Measurements. Total length, 925; tail vertebræ, 170; hind foot, 185.

rufa californica (*Lynx*), Mearns, Proc. U. S. Nat. Mus., XX, 1897, p. 458. Elliot, Syn. N. Am. Mamm., 1901, p. 298.

CALIFORNIA LYNX.

Type locality. San Diego, San Diego County, California.

Geogr. Distr. Lower California, Mexico, and Pacific coast tract of California.

Color. Above reddish brown, mixed with gray and black, and two interrupted black lines from shoulder to root of tail; outer sides of limbs and sides ochraceous buff, mixed with gray and spotted with yellowish brown; inner surface of limbs, under surface of head and body, and under side of tail white, banded or spotted with black; chest with a rusty gray collar spotted with black.

Measurements. Total length, 752; tail vertebræ, 150. Skull: greatest length, 107; occipito-nasal length, 100; Hensel, 89; zygomatic width, 77; interorbital constriction, 22; across postorbital processes, 54; length of nasals, 22; palatal length, 41; length of upper carnassial, alveolar border, 12.



FIG. LX. FELIS R. BAILEYI. BAILEY'S LYNX.

rufa baileyi (*Lynx*), Merr., N. Am. Faun., No. 3, 1890, p. 79. Elliot, Syn. N. Am. Mamm., 1901, p. 297.

BAILEY'S LYNX.

Type locality. Moccasin Spring, Coconino County, Arizona.

Geogr. Distr. Arizona and northern Mexico. (State of Chihuahua.)

Genl. Char. Similar to *F. rufa*, but paler; cranium inflated.

Color. Variable; above from grizzled pale brown and gray (Arizona specimens), to grizzled black and gray (Chihuahua, Mexico, specimens); sides buff or whitish buff; under parts white, spotted with black; top of head mixed brown and white, with an indistinct narrow central brown stripe, and one on each side near ears; thighs pale buff on outer side; legs mixed brown and white above, spotted with black; beneath white, spotted with black; feet pale brown; tail basal three-fourths pale brown, uniform, or barred with rufous, with two narrow subterminal half-rings and tip black, beneath white; ears with anterior border and central outer portion white, remainder black, tufts black. The Mexican specimens are darker and more richly colored than Arizona examples; and the brown stripes on the head are wanting in the latter.

Measurements. Total length, 780; tail vertebræ, 130; hind foot, 170. Skull: occipito-nasal length, 112; Hensel, 91; zygomatic breadth, 77; interorbital constriction, 37; posterior margin of palate to alveolus of incisors, 41; pterygoid fossa from tip of hamular process to palatal arch, 18.5; length of upper sectorial, 13; length of lower jaw, 67; height at coronoid process, 31.

463. peninsularis (*Felis*), Thomas, Ann. Mag. Nat. Hist., 7th Ser., 1, 1898, p. 42.

LOWER CALIFORNIA LYNX.

Type locality. Santa Anita, Lower California, Mexico.

Geogr. Distr. Cape Region of Lower California, Mexico.

Genl. Char. Size very small; braincase small, narrow.

Color. Above pale rufous and gray; long hairs black-tipped; under parts white with black spots; markings of head, face, and ears as in usual style of California lynxes.

Measurements. Total length, 761; tail, 154; hind foot, 160; ear, 81. Skull: basilar length, 91.6; greatest breadth, 76.5.

Fam. II. **Viverridæ. Mongoose, Civets, etc.**

Upper carnassial generally without an anterior lobe; lower with developed talon; second lower incisor on each side higher than first and third; auditory bulla externally constricted, internally divided by a septum, conspicuous from the meatus; digits usually five on each foot, but sometimes the pollex or hallux, or both, are lacking; claws vary in retractility according to types, some species being digitigrade, others somewhat plantigrade.

Subfam. I. **Herpestinæ.**

The members of the subfamily HERPESTINÆ are rather small terrestrial animals, which in the pursuit of their prey sometimes climb trees. Active and courageous, they are constantly searching for their food, which consists of various small quadrupeds, birds, reptiles, insects, and eggs. The species are Indian, African, and one European found in Spain. The genus is not indigenous to the American Continent, and the single species recorded below was imported into Porto Rico, Jamaica, and other islands of the West Indies in order that the snakes, which were very numerous in some of them, might be exterminated; for this little animal is a deadly foe to all serpents, and does not hesitate to attack the most venomous, even the deadly cobra, which it almost invariably destroys. It was supposed, and in Oriental countries the belief still exists, that the Ichneumon, or Mongoose, as it is generally called, when bitten by a poisonous reptile like the cobra, immediately seeks for a root known in India as *manguswail*, and eats it for an antidote. There is, however, no foundation for this story; and the fact is the Mongoose escapes the strokes of the snake simply by its wonderful activity. It may possibly be less susceptible to poison than many mammals; but if a cobra happens to strike a Mongoose fairly it dies, as any other creature would. This animal is a good ratter, and will clear any place infested by rats and mice in a short time. In Jamaica it has nearly exterminated the rats that inflicted much injury to the sugar cane, and it also killed the snakes; and now for lack of these creatures, it has turned its attention to chickens and native birds and their eggs, and has become very much of a pest itself, threatening the poultry of the inhabitants as well as their forest birds. The importation into a country of most animals that are foreign to it, while a possible benefit for a time, will almost certainly prove, if they survive, a greater evil than the one they were expected to cure. When angry, the Mongoose growls and raises the hair upon the body, and especially that of the tail, and this erect, thick covering probably helps to shield it from the attacks of serpents when fighting with these reptiles.

86. Herpestes. Ichneumons.

$$I. \frac{3-3}{3-3}; C. \frac{1-1}{1-1}; P. \frac{4-4}{4-4} \text{ or } \frac{3-3}{3-3}; M. \frac{2-2}{2-2} = 40 \text{ or } 36.$$

Herpestes Illig., Prodr. Syst. Mamm., et Av., 1811, p. 135. Type *Viverra ichneumon* Linnæus.

Head slender, pointed; body lengthened, slender; ears short, rounded; tail generally hairy, thick at base, rather long in most

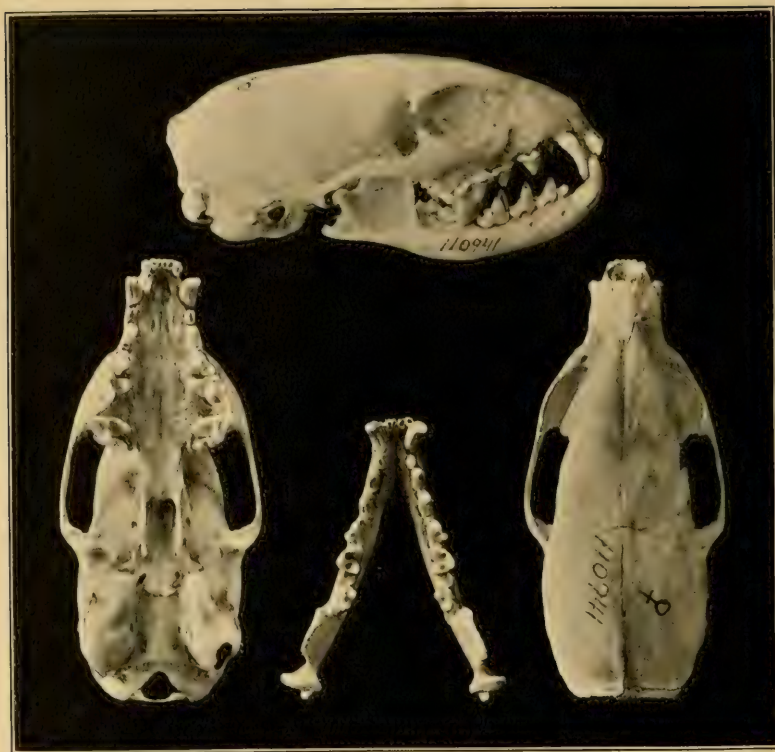


FIG. 85. *HERPESTES MUNGO*.
No. 110941 U. S. Nat. Mus. Coll. Nat. size.

species; legs short; five toes on each foot, the first one short; claws lengthened, not retractile; palms usually naked. Skull with short face and elongated braincase, postorbital constriction great; palate extending beyond posterior molars; pterygoids short; pterygoid fossa wanting.

464. mungo (*Viverra*), Gmel., Syst. Nat., 1, 1788, p. 84.

COMMON INDIAN MUNGOOSE.

Type locality. India. Introduced into the Islands of Jamaica, Porto Rico, St. Kitts, etc.

Genl. Char. Hair long, ragged; tail hairy, shorter than head and body; tarsus naked to heel; palate extending midway between last molars and posterior end of pterygoids, which are parallel.

Color. Grayish brown, speckled with white or light gray, sometimes tinged with ferrugineous; hairs with dark brown and grayish white rings alternating.



FIG. LXI. HERPESTES MUNGO. MONGOOSE.

Measurements. Total length, 737–890; tail, 356–380. Skull: basal length, 75; zygomatic width, 42. The size of both animals and skulls varies, however, considerably, and the female is usually the smaller.

The family CANIDÆ contains various animals, such as Dogs, Wolves, Foxes, Jackals, etc., which have a great uniformity of structure and similar habits. It is a cosmopolitan group, and its members are sociable, fond of each other's society, and some of the species usually hunt in packs, and are possessed of more intelligence than falls to the lot of most quadrupeds. A great number of species and many varieties are recognized, some of them very unsatisfactorily defined. The group is divided into two series, the Lupine and the Vulpine, the former containing the wild and domestic Dogs, Wolves, and Jackals, the latter the true Foxes and their allies. These are distributed over many lands, and their coats, like those of the cats, vary in length of hair and thickness of fur according as the climate is productive of excessive degrees of heat or cold. As a general rule, the animals of northern habitats are larger and more powerful than their brethren of southern latitudes, but their habits are the same.

Unlike Cats, which depend upon a stealthy approach and sudden spring to secure their prey, the members of the Canidæ run their's down in the open, frequently giving cry as they speed onward in the chase. The species most dreaded are the great timber wolves, which, when rendered desperate by hunger, assemble in packs, and do not hesitate to attack any animal on their domain, not even man himself. Jackals and Coyotes are little wolves by comparison, the former inhabitants of the Old World, the latter of the New. Wild Dogs are also natives of the Eastern Hemisphere in parts of Central Asia, and the Oriental region; none are found in North America. The Vulpine group has many species of true foxes, as well as some genera containing doglike animals of the wolf series, like the Cape Hunting Dog of Africa (*Lycan pictus*) and the Bush Dog of South America (*Iticyn venaticus*). The variations in the structure of the members of the Canidæ are very slight, consisting in the number of molar teeth, some possessing more, others less, and in the case of the Hunting Dog, fewer toes, and the same number on all feet. Trifling variations in the skull and the size of the teeth have been seized upon for specific distinction, but like the numberless shades of color in their coats, but little dependence can be placed on the majority of these characters for a satisfactory specific diagnosis. The gradations from one form to another in all the members of this family would seem to defy all efforts to affix a boundary to many of those designated as worthy of separate rank.

Fam. III. **Canidæ. Wolves. Foxes.**

St. George Mivart. *Monograph of the Canidæ*, 1890.

C. H. Merriam. *Review of the Coyotes*, Proc. Biol. Soc. Wash., 1897, p. 19.

Claws not retractile; feet digitigrade; four toes on hind foot, five on fore foot, one rudimentary situated high above the others, sometimes absent; bullæ inflated; paroccipital process in contact with bullæ.

Subfam. I. **Caninæ.**

87. Canis.

$$I. \frac{3-3}{3-3}; C. \frac{1-1}{1-1}; P. \frac{4-4}{4-4}; M. \frac{2-2}{3-3} = 42.$$

Canis Linn., Syst. Nat., 1, 1758, p. 38; 1, 1766, p. 56. Type *Canis familiaris* Linnæus.

Lupus Frisch, Nat. Syst. vierfüß. Thiere, in Tab., 1775. Oken. Schrb. Naturg. 1816, Zoöl. 2te Abth., p. 1039.



CANIS MEXICANUS.

No. 7618 Field Columbian Mus. Coll. ♂ nat. size.

Alopex Kaup. Entw.-Gesch. & Naturl. Syst. Europ. Thierw., 1, 1829, p. 83.

Lyciscus H. Smith, in Jard., Nat. Libr. Mamm., ix, 1839, pp. 160-166.

Leucocyon Gray, Proc. Zool. Soc., 1868, p. 561.

Neocyon Gray, Proc. Zool. Soc., 1868, p. 506.

Nose long, tapering; jaws elongate; postorbital processes short; orbit open posteriorly; braincase lengthened, compressed anteriorly; claws short, blunt, slightly curved; upper carnassial with a strong blade, the middle lobe conical, pointing backward, the anterior lobe nearly obsolete; lower carnassial with a bilobed blade, compressed, the hinder lobe the larger, with two cusps and a raised interior border.

KEY TO THE SPECIES.

A. Size small; tail about half the length of body.

a. Teeth large, heavy.

PAGE

a.' Under surface of tail ochraceous; tip black. . . . *C. lestes* 465

b.' Under surface of tail fulvous; tip black.

a." Rostrum thick; palate short, broad. . . . *C. cagottis* 466

b." Rostrum longer; palate longer, wider. . *C. peninsulæ* 466

c." Rostrum short; palate very broad. . . . *C. clepticus* 467

c.' Under surface of tail fulvous, basally

whitish. *C. vigilis* 467

b. Teeth small.

a.' Forearm bright orange; no black *C. mearnsi* 468

b.' Forearm pale fulvous *C. impavidus* 468

c.' Forearm mixed with black on upper side. . *C. microdon* 469

d.' Forearm bright buff *C. estor* 469

e.' Forearm deep fulvous *C. ochropus* 469

B. Size large; tail longer than half the body with-

out head; colors variable. *C. mexicanus* 471

465. *lestes* (*Canis*), Merr., Proc. Biol. Soc. Wash., xi, 1897, p. 25.

Elliot, Syn. N. Am. Mamm., 1901, p. 301.

ROBBER COYOTE. Coyote in Spanish America for all small wolves.

Type locality. Toyabe Mountains, near Cloverdale, Nye County, Nevada.

Geogr. Distr. Northern Mexico probably, through Arizona and New Mexico to Washington and Southern British Columbia.

Genl. Char. Size medium; ears and tail large; color similar to that of *C. latrans*. Skull and teeth medium.

Color. Muzzle pale cinnamon rufous; top of head grizzled gray and ochraceous; crown, nape, and ears fulvous; rest of upper parts

grayish buffy mixed with black; under parts whitish tinged with buff on belly; ruff tipped with black; fore and hind legs buffy ochraceous on outer side, whitish on inner side, and also on the hind feet; tail broadly tipped with black, white beneath on basal third, ochraceous on remainder, the hairs tipped with black towards the black tip.

Measurements. Total length, 1116; tail vertebræ, 320; hind foot, 200. Skull: basal length, 170; Hensel, 166; zygomatic breadth, 102; palatal length, 88; mastoid breadth, 62; length of crown of upper sectorial, 21.5.

466. *cagottis* (*Canis*), H. Smith, in *Jard. Nat. Libr., Mamm.*, 1839, p. 164.

SMITH'S COYOTE.

Type locality. Rio Frio, between City of Mexico and Puebla, Mexico.

Geogr. Distr. States of Mexico and Oaxaca, Mexico, and probably in others; range not determined.

Genl. Char. Similar to *C. peninsulæ*, but larger and more red.

Color. Upper parts mixed fulvous, buff, and black; nose ferruginous; crown, nape, and ears fulvous; outer side of legs and feet fulvous; inner side of hind legs white; tail with black-tipped hairs, under side basally white, remainder fulvous.

Measurements. Total length, 1132; tail vertebræ, 304; hind foot, 195. Skull: basal length, 164; Hensel, 160; zygomatic width, 98; palatal length, 84; mastoid breadth, 59; length of upper sectorial, crown, 21.

467. *peninsulæ* (*Canis*), Merr., *Proc. Biol. Soc. Wash.*, xi, 1897, p. 28.

LOWER CALIFORNIA COYOTE.

Type locality. Santa Anita, Cape St. Lucas, Lower California, Mexico.

Geogr. Distr. Cape Region of Lower California, Mexico.

Genl. Char. Similar to *C. ochropus* of California in size, but darker.

Color. Upper parts mixed ochraceous and black; top of head mixed grayish fulvous and black; nose rufous; collar mixed buff and black; legs and feet fulvous; under parts pale fulvous and black; tail beneath white basally, then fulvous, and hairs black-tipped.

Measurements. Total length, about 1100; tail vertebræ, 300; hind foot, 180. Skull: basal length, 160; Hensel, 167; zygomatic width, 99; palatal length, 90; mastoid breadth, 57; crown of upper sectorial, 20.5.

468. vigilis (*Canis*), Merr., Proc. Biol. Soc. Wash., XI, 1897, p. 33.

COLIMA COYOTE.

Type locality. Manzanillo, State of Colima, Mexico.

Geogr. Distr. State of Colima, Mexico; range unknown.

Genl. Char. Similar to *C. peninsulæ*; darker.

Color. Upper parts mixed buffy ochraceous and black; nose rufous; top of head fulvous and black; under parts pale fulvous; legs and feet fulvous mixed with black on hind leg; tail similar to that of the other forms, above like back, beneath basally whitish, rest fulvous.

Measurements. Total length, 1155; tail vertebræ, 335; hind foot, 190. Skull: basal length, 166; Hensel, 163; zygomatic breadth, 87; palatal length, 85; mastoid breadth, 59; crown of upper sectorial, 17.5.

469. clepticus (*Canis*), Elliot, Pub. Field Columb. Mus., III, 1903, p. 225. Zoölogy.

THIEVISH COYOTE.

Type locality. Vallecitos, San Pedro Martir Mountains, Lower California, Mexico; 9,000 feet elevation.

Genl. Char. Summer pelage reddish; size small. Skull short, broad; braincase and across postorbital processes wide, the latter long; nasals rather short, narrow; rostrum narrow; pterygoid fossa broad, long; outline of bullæ on basioccipital not approaching posteriorly; palate wide between molars; occipital crest prominent; teeth small, weak; tail short, bushy.

Color. September. Nose cinnamon rufous; cheeks mixed gray and black; upper lip, chin, and between jaws grizzled grayish white; top of head grizzled black, gray, and fulvous; back of ears, occiput, and back of neck deep buffy ochraceous, uniform; rest of upper parts tawny, or tawny ochraceous with numerous white-tipped hairs intermingled; lower part of throat white; sides of neck and collar beneath throat buff; chest, abdomen, and inner sides of thighs near body white; rest of under parts grizzled grayish buff and black; shoulders pale buffy ochraceous; fore and hind legs rich fulvous; feet paler, whitish on toes at base of claws; tail tawny ochraceous, white at base beneath; inner side and edge of ears white; new hairs of the winter pelage black with white tips.

August examples in greatly worn pelage are darker, tawny, with a great many white-tipped long blackish brown hairs intermingled with the rest, probably the remains of the winter coat.

Measurements. Type female. Total length, 1030; tail vertebræ, 275; hind foot, 173; ear, 110. Skull: total length, 169 (173); occipito-nasal length, 147 (163); Hensel, 149 (153); zygomatic width, 94 (95);

interorbital constriction, 29 (30.5); width of braincase above zygomata, 59 (60); across postorbital processes, 46 (46.5); median length of nasals, 53 (60); lateral length of nasals, 63 (67); width of rostrum above last premolar, 27 (25); palatal length, 81 (82); width of palate at posterior ends of carnassials, 42 (40); between last molars, 29.5 (27); palatal arch to end of hamular process of pterygoid, 30 (31.5); width of basi-sphenoid at anterior margin of bullæ, 15 (15.5); width of basi-occipital at posterior margin of bullæ, 14 (15); length of upper carnassial, outer alveolar border, 10 (16); length from anterior edge of canine to posterior margin of last molar, alveolar border, 71 (75); alveolar length of upper molar series, 29.5 (33); postero-antero width of last molar, 5 (6); length of last molar, 9 (10.5); length of mandible, angle to alveolus of outer incisor, 121 (123); height at condyle, 24 (23.5); at coronoid process, 47 (50); alveolar length of lower carnassial, 12 (19); length of lower molar series, 36 (42); anterior margin of canine to posterior margin of last molar, alveolar border, 77 (83.5).

The numbers in parentheses are the measurements of a skull of a male.

470. mearnsi (*Canis*), Merr., Proc. Biol. Soc. Wash., XI, 1897, p. 30.

Elliot, Syn. N. Am. Mamm., 1901, p. 302.

MEARNS' COYOTE.

Type locality. Quitobaquita, Pima County, Arizona.

Geogr. Distr. State of Sonora, Mexico, to southern Arizona.

Genl. Char. Size small; color bright; skull and teeth small.

Color. Forehead grizzled gray and fulvous; top of head, nape, and ears light fulvous; muzzle cinnamon rufous; rest of upper parts buffy ochraceous mixed with black; under parts white; belly tinged with buffy ochraceous; throat buffy, hairs tipped with black; fore and hind legs and feet bright orange fulvous all around; upper side of fore legs with black mixture; tail beneath pale fulvous, whitish at base; remainder with black-tipped hairs; tip of tail black.

Measurements. Total length, 1100; tail vertebræ, 330; hind foot, 180. Skull: basal length, 163; Hensel, 160; zygomatic breadth, 83; palatal length, 88; mastoid breadth, 56.5; crown of upper sectorial, 19.

471. impavidus (*Canis*), Allen, Bull. Am. Mus. Nat. Hist., 1903, p. 609.

BOLD COYOTE.

Type locality. Rio del Bocas, State of Durango, Mexico. Altitude, 7,000 feet.

Genl. Char. "Similar in coloration to *C. cagottis*, but much larger, and the upper carnassial with a prominent protocone; in size and dental characters similar to *C. mearnsi*, but much paler, the

throat and ventral region only slightly suffused with pale fulvous instead of buffy ochraceous, and fore and hind legs and feet not bright orange fulvous all around, but fore legs posteriorly, and hind legs and feet anteriorly pale fulvous or pale yellowish white, as in *cagottis*."

Measurements. "Type, total length, 1143; head and body, 838; tail vertebræ, 305; hind foot, 178. Skull: total length, 190; Hensel, 163; palatal length, 89; zygomatic breadth, 93; mastoid breadth, 59; length of crown of upper carnassial, 19.3." (Allen, l. c.)

472. microdon (*Canis*), Merr., Proc. Biol. Soc. Wash., XI, 1897, p. 29. TAMAULIPAS COYOTE.

Type locality. Mier, on the Rio Grande, State of Tamaulipas, Mexico.

Geogr. Distr. State of Tamaulipas, Mexico; range unknown.

Genl. Char. Size small; colors dark.

Color. Upper parts buffy ochraceous and black; nose rufous; ears fulvous; crown grayish ochraceous; under parts whitish; middle of belly buffy and black; legs and feet fulvous, whitish on inner side of legs; tail above like back, beneath whitish at base, rest pale fulvous, with black-tipped hairs.

Measurements. Total length, 1070; tail vertebræ, 320; hind foot, 186. Skull: basal length, 161; Hensel, 158; zygomatic breadth, 93.5; palatal length, 84; mastoid breadth, 57; crown of upper sectorial, 16.5.

473. estor (*Canis*), Merr., Proc. Biol. Soc. Wash., XI, 1897, p. 31. NOLAND'S RANCH COYOTE.

Type locality. Noland's Ranch, San Juan River, San Juan County, Utah.

Geogr. Distr. Lower California, Mexico, north to the deserts of eastern California, Nevada, and Utah.

Genl. Char. Size small; color pale; carnassial and molar teeth small.

Color. Muzzle pale fulvous; top of head gray and buff; ears and nape ochraceous buff; upper parts buffy mixed with black; under parts whitish; ruff conspicuously black-tipped; outer side of fore legs bright buff, pale on inner side and on fore feet; outer side of hind legs and feet buffy ochraceous; inner side of hind leg and upper surface of hind foot white; under side of tail ochraceous, white basally, hairs of distal half tipped with black; tip of tail black.

Measurements. Total length, 1052; tail vertebræ, 300; hind foot, 179. Skull: basal length, 159; Hensel, 155; zygomatic breadth, 89; mastoid breadth, 57; palatal length, 84; upper sectorial, crown, 17.2.

474. ochropus (*Canis*), Eschsch., Zool. Atlas, III, 1829, pp. 1-2, pl. 11. Elliot, Syn. N. Am. Mamm., 1901, p. 303.

OCHRACEOUS-FOOTED COYOTE.

Type locality. California. Typical style from Tracy, San Joaquin County, California.

Geogr. Distr. Lower California, Mexico, to San Joaquin Valley, California.

Genl. Char. Similar to *C. latrans*, but smaller, darker, and more highly colored; ears larger, skull and teeth smaller.

Color. Muzzle grizzled cinnamon rufous; top of head grayish fulvous; rest of upper parts buffy ochraceous mixed with black; under parts whitish; belly tinged with buff; ruff grizzled, hairs tipped with black, sometimes going on the breast, as in *C. estor* and *C. mearnsi*; fore and hind legs and feet fulvous all round, paler on inner side, and very deep on outer side of hind leg; upper side of fore leg strongly marked with black; outer side of thighs with black-tipped hairs; tail beneath pale fulvous, white basally, tipped and edged with black; on terminal third of under side the hairs are black-tipped; extreme tip often white.

Measurements. Total length, 1110; tail vertebræ, 295; hind foot, 180. Skull: basal length, 177; Hensel, 174; zygomatic breadth, 94; palatal length, 98; mastoid breadth, 62; crown of upper sectorial, 19.



FIG. LXII. CANIS MEXICANUS. MEXICAN TIMBER WOLF.

475. mexicanus (*Canis*), Linn., Syst. Nat., 1, 1766, p. 60.

MEXICAN TIMBER WOLF. *Lobo* in Spanish America.

Type locality. Mexico.

Geogr. Distr. States of Sonora and Chihuahua, Mexico; range unknown.

Genl. Char. Size large; tail longer than half the body without head; prevailing hues clouded yellow, white, and black.

Color. Nose buff on sides, grizzled on top; face and chin mixed black and white; sides of face gray; back black; hind part of neck grayish white; sides and under parts buffy white; throat and under parts of neck dark gray and white in patches; outer side of limbs rich buff, inner side white; tail above mixed black and white, beneath white, tip black; feet pale yellowish white; ears deep buff, the tips grizzled black and buff.

Measurements. Total length, 1580; tail to end of hairs, 470 (skin). Skull: occipito-nasal length, 226; Hensel, 213.5; zygomatic breadth, 126.5; mastoid breadth, 74.5; median length of nasals, 73; from alveolus of incisor to palatal arch, 119; postpalatal length, 95; crown of upper sectorial, 26.5; length of lower jaw, 183; height at coronoid process, 72; length of lower sectorial, crown, 29.

Foxes, with their pointed noses and long bushy tails, are familiar animals to most persons. The very shape of the head gives these creatures that aspect of cunning and sagacity for which they are eminently noted. Foxes are fond of solitude, and live alone in a burrow which each individual has dug for himself or appropriated by force from some other animal, the sufferer being frequently the badger. Sometimes a family may inhabit a single burrow, the dog Fox remaining with the mother after the cubs are born, and woe to the occupants of the hen coops in their vicinity while they remain in residence. Two genera of Foxes are recognized in North America, *Urocyon* and *Vulpes*, distinguished by the presence or absence of a hidden stiff-haired mane in the tail, and by some cranial characters.

88. *Vulpes*.

$$I. \frac{3-3}{3-3}, C. \frac{1-1}{1-1}, P. \frac{4-4}{4-4}, M. \frac{2-2}{2-2} = 40.$$

Vulpes *Briss. Reg. Anim., 1758, p. 239. Type *Canis vulpes* Linnaeus. Frisch. Natur. Syst. vierfüß. Thiere, in Tab., Gen. 1775.

Leucocyon Gray, Proc. Zool. Soc., 1868, p. 521.

*Should Brisson not be an authority for genera, then Frisch takes precedence for *Vulpes*.

Body rather short; legs short; tail long, more than half the length of the body; fur soft, hair long; muzzle elongate, tapering; ears moderate, erect; nasals not extending back to maxillæ; postorbital processes concave above; temporal crests nearly in contact.



FIG. 86. *VULPES MACROTIS*.

No. 15843 Am. Mus. Nat. Hist. Coll. $\frac{2}{3}$ nat. size.

476. *macrotis* (*Vulpes*), Merr., Proc. Biol. Soc. Wash., iv, 1888, p. 136. Elliot, Syn. N. Am. Mamm., 1901, p. 306.

BIG-EARED KIT FOX.

Type locality. Riverside, San Bernardino County, California.

Geogr. Distr. Lower California and States of Chihuahua and Sonora, Mexico, into southern California.

Genl. Char. Size small; ears long, broad; muzzle, legs, and tail long and slender.

Color. Above grizzled gray, darkest on back; sides, pectoral band, and upper parts of limbs pale fulvous; chin and throat white; under parts mixed white and buff; tail like back, terminal fourth black; ear pale fulvous and iron gray, the margin white.



FIG. LXIII. VULPES MACROTIS. BIG-EARED KIT FOX.

Measurements. Total length, 850; tail vertebræ, 290; hind foot, 110; ear from crown, 68. Skull: occipito-nasal length, 103; greatest zygomatic breadth, 58.2; mastoid breadth, 38.7; interorbital constriction, 19.8; across postorbital processes, 26.3; palatal length, 55.7; length of nasals, 40; length of upper tooth row, 51.7; length of lower jaw, 83.8; height at coronoid process, 27; length of lower tooth row, 57.8.

The Gray Foxes, included in the present genus, are represented in North America by a number of species and races varying considerably in size, the smallest not being more than half that of the well-known eastern Gray Fox. They are very handsome animals, but not possessed of the cunning equal to that of the Red Fox, and in the struggle for existence seem, in their diminishing numbers, to be giving way to their more fit relative.

89. *Urocyon*.

$$I. \frac{3-3}{3-3}; C. \frac{1-1}{1-1}; P. \frac{4-4}{4-4}; M. \frac{2-2}{3-3} = 42.$$

Urocyon Baird, Mamm. N. Am., 1857, p. 121. Type *Canis cinereo-argenteus* Schreber.

"Tail with a concealed mane of stiff hairs, without any soft fur intermixed; muzzle short; temporal crests widely separated; upper incisors scarcely lobed; postorbital processes bent but little down-



FIG. 87. *UROCYON CINEREO-ARGENTUS FRATERCULUS*.

No. 1160 Field Columbian Mus. Coll. $\frac{2}{3}$ nat. size.

ward, the anterior edge turned up; a longitudinal shallow pit at its base; supplementary tubercle on the lower sectorial; the under jaw with an angular emargination below," (Baird, l. c.)

KEY TO THE SPECIES AND SUBSPECIES.

A. Size small.

- | | | |
|---|--------------------------|------|
| a. Tail nearly one-half the length of head and body. | | PAGE |
| a.' Bullæ small..... | <i>U. c. guatemalæ</i> | 475 |
| b.' Bullæ large..... | <i>U. c. fraterculus</i> | 475 |
| b. Tail nearly one-third length of head and body..... | <i>U. c. parvidens</i> | 476 |

B. Size large.

- | | | |
|--|---------------------------|-----|
| a. Sides of neck, base of ears, and limbs cinnamon rufous..... | <i>U. c. californicus</i> | 477 |
| b. Paler; ears and tail longer..... | <i>U. c. scotti</i> | 477 |
| c. Sides of neck, base of ears, and limbs ochraceous..... | <i>U. c. texensis</i> | 478 |

cinereo-argenteus guatemalæ (*Urocyon*), Miller, Proc. Acad. Nat. Scien. Phil., 1899, p. 278.

GUATEMALAN GRAY FOX.

Type locality. Nenton, Guatemala.

Geogr. Distr. Humid tropical region of Guatemala, and State of Chiapas, Mexico.

Genl. Char. Similar to *U. c. littoralis* Baird, but darker.

Color. Above gray, lower fur creamy buff; sides more buffy; middle of belly and between hind legs white, remainder ochraceous buff; top of head tawny; back of ear tawny ochraceous, this hue extending to front leg but suffused with gray; ear ochraceous, distal half interspersed with dusky; cheek and throat white; feet dark grizzled grayish; outer side of hind leg ochraceous, inner side white; tail gray and black, with black dorsal band and tip, beneath ochraceous.

Measurements. Total length, 830; tail vertebræ, 327; hind foot, 128. Skull: greatest length, 111; basal length, 101; palatal length, 51.4; nasals, 33; zygomatic breadth, 60; interorbital breadth, 21.4; mastoid breadth, 40; upper tooth row, 46; mandible, 81; lower tooth row, 51.

cinereo-argenteus fraterculus (*Urocyon*), Elliot, Pub. Field Columb. Mus., 1, 1896, p. 80.

LITTLE GRAY FOX.

Type locality. San Felipe, Yucatan, Mexico.

Geogr. Distr. Yucatan, Tehuantepec; range unknown.

Genl. Char. Size small; colors dark.

Color. Top of head silvery gray, darkest on median line; superciliary stripe grayish white; back of head and neck gray washed with fulvous; upper parts dark gray, lower back black sprinkled with gray;

FIG. LXIV. *UROCYON C. FRATERCULUS*.

ears at base dark fulvous, rest to tips brownish gray; sides of neck and pectoral band fulvous; chin black; rest of under parts buffy white except neck in front, which is pure white; legs on outer sides dark fulvous; buff on inner sides, with a whitish line inside thighs; tail silvery gray, with a brownish black line down the center and a rufous one beneath, tip black.

Measurements. Total length, 750; tail to end of hairs, 343; hind foot, 95; ear, 50. Skull: occipito-nasal length, 91; Hensel, 90.5; zygomatic width, 53; interorbital constriction, 19; palatal length, 38; postpalatal length, 43; length of upper sectorial, alveolus, 10; length of lower jaw, 73; height at coronoid process, 26.

cinereo-argenteus parvidens (*Urocyon*), Miller, Proc. Acad. Nat. Scien. Phil., 1899, p. 276.

SMALL-TOOTHED FOX.

Type locality. Merida, Yucatan, Mexico.

Geogr. Distr. Yucatan, Mexico.

Genl. Char. Like *U. c. fraterculus*, but with smaller teeth and shorter tail.

Color. Above gray, tinged with buff, darkest on dorsal line; sides more buffy; cheeks, sides of nose, throat, middle of under parts

and inner sides of thighs white; outer sides of legs ochraceous buff; feet buffy white; ears ochraceous buff, inner surface buffy white; tail gray with a black dorsal stripe and tip, beneath buffy.

Measurements. Total length, 720; tail vertebræ, 240; hind foot, 95. Skull: greatest length, 102; basal length, 94.4; zygomatic width, 53; interorbital breadth, 20.4; width of postorbital processes, 30.4; mastoid breadth, 36.4; median palatal length, 47; median length of nasals, 30; length of upper tooth row, 41; length of mandible, 74; length of lower tooth row, 46.

cinereo-argenteus californicus (*Urocyon*), Mearns, Proc. U. S. Nat.

Mus., 1897, p. 459. Elliot, Syn. N. Am. Mamm., 1901, p. 308.

CALIFORNIA GRAY FOX.

Type locality. San Jacinto Mountains, Riverside County, California. Altitude, 8,000 feet.

Geogr. Distr. Lower California, Mexico, to Washington.

Genl. Char. Similar to *U. cinereo-argenteus*, with larger ears and grayer, less fulvous coloring.

Color. Like *U. cinereo-argenteus*, with the color of the back about the same, but the coloration as a whole is paler, and the California animal lacks the black down the fore legs.

Measurements. Total length, 890; tail vertebræ, 330; hind foot, 120; ear from crown, 85. (Mearns, l. c.) Skull: occipito-nasal length, 117; total length, 127; Hensel, 115; zygomatic width, 69; postorbital constriction, 26; across orbital processes, 37; median length of nasals, 41; palatal length, 60; postpalatal length, 55; length of upper molar series, alveolar border, 42; length of mandible, angle to symphysis, 94.5; length of lower molar series, alveolar border, 48.

cinereo-argenteus scotti Mearns, Bull. Am. Mus. Nat. Hist., 1891, p. 236. Elliot, Syn. N. Am. Mamm., 1901, p. 308.

SCOTT'S GRAY FOX. *Zorro* in Mexico, *Tigrillo* in Costa Rica.

Type locality. Pinal County, Arizona.

Geogr. Distr. Southern California, Arizona, New Mexico, and northern Mexico.

Genl. Char. Similar to *U. cinereo-argenteus*, but ears and tail are longer, and colors usually paler.

Color. Hoary gray, sometimes a median black line from head to base of tail; sides paler; lower jaw and sides of muzzle black, except white spot near tip; lower sides of cheeks, throat, patch on breast, and one on belly white; sides of neck and hinder surface of legs yellowish fulvous; tail gray with a narrow black stripe above, and beneath yellowish fulvous.

Measurements. Total length, 985; tail vertebræ, 405; hind leg from knee joint, 240. Skull: occipito-nasal length, 113; Hensel, 103; zygomatic width, 68; palatal length, 57; postpalatal length, 55.5; length of upper sectorial, alveolus, 9; length of mandible, 92; height at coronoid process, 44; length of lower sectorial, alveolus, 11.

cinereo-argenteus texensis (*Urocyon*), Mearns, Proc. U. S. Nat.

Mus., 1897, p. 459. Elliot, Syn. N. Am. Mamm., 1901, p. 308.

TEXAN GRAY FOX.

Type locality. San Pedro, near Eagle Pass, Maverick County, Texas.

Geogr. Distr. Northern Mexico on boundary line into Texas.

Genl. Char. Similar to *U. cinereo-argenteus*, but ochraceous in color where the typical form is cinnamon rufous.

Color. Markings of the limbs, sides of neck, and base of ears, which are chestnut or cinnamon rufous in the typical form, are ochraceous. (Mearns, l. c.)

Measurements. Height of ear above crown, 80; hind foot, 128; tail vertebræ, 350.

With the Bears begins the second division of the Carnivora, the Plantigrades, or those that walk on the sole of the foot. In a degree these animals are terrestrial and semi-aquatic, the Polar Bear probably passing the major portion of its life in the water. They are among the largest of quadrupeds in bulk, and although the species are comparatively few, they are found over a large portion of the World. They are omnivorous, nothing seeming to go amiss with their voracious appetite, from the diminutive ant to the bullock. All kinds of roots, grasses, and other vegetable foods are eaten by them, and if the nest of the honey-bee can be discovered, these beasts consider themselves in great luck, and greedily devour the sweet store of which they are extremely fond, bearing the numerous stings received from the angry insects with fortitude, although their manifestations of disgust and rage at the punishment received may be many and violent. Beside the Polar Bear in the Arctic region, there are in North America, the Alaskan Brown Bear, the Grizzly, the Cinnamon or Black Bears, and the Glacier Bear, with sundry races of these of more or less questionable distinctive value. Within the limits of territory comprised in this work, two of the Bears above mentioned are found, the Black or Cinnamon, and the Grizzly, and these are separated from their relatives of the more northern portion of the continent on account of some variation in the skulls. Wherever found, the habits of North American Bears are practically the same,



URSUS HORRIÆUS.

No. 9864 Field Columbian Mus. Coll. $\frac{1}{3}$ nat. size.

and from spring to late autumn they constantly roam the woods and open places searching for food. Some Grizzlies are said to reach a weight of 1,000 to 1,200 pounds, but such enormous beasts are rare, the majority being very much smaller. It is not very unusual, however, to find one of these animals that will measure eight feet, and even more, when standing erect upon its hind legs. In Mexico Bears are found in the mountain ranges, sometimes at high altitudes.

Fam. IV. **Ursidæ. Bears.**

True molars with broad, flat tubercular crowns; fourth upper premolars with no inner root; bullæ scarcely inflated; soles naked; feet plantigrade.

Subfam. I. **Ursinæ.**

90. **Ursus.**

$$I. \frac{3-3}{3-3}; C. \frac{1-1}{1-1}; P. \frac{4-4}{4-4}; M. \frac{2-2}{3-3} = 42.$$

C. H. Merriam. *Preliminary Synopsis of the American Bears*, Proc. Biol. Soc. Wash., 1896, p. 65.

Ursus Linn., Syst. Nat., 1, 1758, p. 47; 1, 1766, p. 69. Type *Ursus arctus* Linnæus.

Thalassarctos! Gray, Ann. of Phil., 1825, xxvi, p. 339.

Danis Gray, Ann. of Phil., xxvi, 1825, pp. 60, 339.

Thalarctos! Gray, Ann. of Phil., xxvi, 1825, p. 62.

Euarctos! Gray, Proc. Zool. Soc., 1864, p. 692.

Size large; body heavy, bulky; three upper and under anterior molars are very small and with but a single root, and are frequently deciduous; fourth upper premolar lacks inner tubercle supported by a separate root; fourth premolar larger than those before it, that in upper jaw has three roots, the one in the lower two; skull elongate; feet broad; toes armed with long, somewhat curved, non-retractile claws; palms and soles naked; tail exceedingly short; ears erect, rather short, hairy.

KEY TO THE SPECIES.

	PAGE
A. Front claws longer than hinder; fur shaggy <i>U. horricus</i>	480
B. Front claws short, not longer than hinder; fur uniform, smooth <i>U. machetes</i>	481

A. *Danis*.

"Fur shaggy; front claws longer than the hinder, broadly depressed, whitish; palate narrow and contracted behind; ears small; hind foot elongate."



FIG. LXV. *URSUS HORRIÆUS*. MEXICAN GRIZZLY BEAR.

477. horriæus (*Ursus*), Baird, Mex. Bound. Surv., Mamm., 11, 1859, p. 24. Elliot, Syn. N. Am. Mamm., 1901, p. 312.

MEXICAN GRIZZLY BEAR.

Type locality. Los Nogales, State of Sonora, Mexico, near border of Pima County, Arizona.

Geogr. Distr. States of Chihuahua and Sonora, Mexico, north to Colorado, Utah, and southern California.

Genl. Char. Size large; frontal region highest between post-orbital processes; sagittal crest prominent; skull long, narrow.

Color. Variable as in northern grizzlies; general hue dark. A large specimen from Casas Grandes, Sierra Madre, State of Chihuahua, Mexico, has head and back mixed dark brown, black, and yellowish gray, and with a jet black patch between the shoulders; rump, legs, and sides black; chest and under parts dark brown; nails brownish white.

Measurements. Skull of the Casas Grandes specimen. Occipito-nasal length, 310; Hensel, 312; greatest length, 368; zygomatic breadth, 197.5; width across postorbital processes, 108; length of nasals, 86; width anteriorly, 37; mastoid breadth, 146; palatal length, 137; anterior margin of foramen magnum to palatal arch, 146; length



URSUS MACHETES.

No. 436 Field Columbian Mus. Coll. $\frac{1}{3}$ nat. size.

Face view $\frac{1}{2}$ nat. size.



URSUS MACHETES.
No. 436 Field Columbian Mus. Coll. $\frac{1}{2}$ nat. size.

of upper tooth row, 74; length of molar, 34; length of lower jaw, 229; of lower tooth row, 79.

B. Euaretus.

"Fur uniform throughout, either black, brownish, or cinnamon; hair darkest towards tips; nose brown; feet moderate; fore claws not twice as long as the hinder."

478. machetes (*Ursus*), Elliot, Pub. Field Columb. Mus., III, 1903, p. 235. Zoölogy.

FIGHTING BEAR.

Type locality. Casas Grandes, Sierra Madre, State of Chihuahua, Mexico.

Geogr. Distr. Northern Mexico.

Genl. Char. Color, cinnamon or black. Skull long, frontals broad, raised above level of face; nasals very broad, posterior ends on a line with ends of maxillæ; superior outline convex, highest just behind postorbital processes, and declining gradually anteriorly, sharply posteriorly; occipital crest prominent, extending forward to coronal suture; zygomatic arches very wide; basioccipital and basisphenoid wide; pterygoid fossa equal in width throughout its length, broad and rounded anteriorly; mandible heavy, deep beneath last molar; coronoid process very broad, and rounded on top without hook over posterior margin; upper and lower molars much worn, the larger one quite smooth, so that their characteristics are absent.

Color. Black with tan nose, or all cinnamon.

Measurements. Skull: total length, 315; occipito-nasal length, 282; Hensel, 267; zygomatic width, 196; interorbital width, 75; across postorbital processes, 103; mastoid width, 132; posterior width of basioccipital, 39; length of pterygoid fossa, 49; palatal length, 145; length of nasals, 75; anterior width of nasals, 30; width at mid-length of nasals, 26; anterior edge of canine to posterior edge of last molar, alveolar border, 99; length of last molar, crown, 24; width, 19; width of palate at anterior edge of last molar, 53; between canines at posterior edge, 46; breadth of muzzle at outer side of canines, 66; length of mandible, angle to symphysis on top, 212; height at condyle, 30; at coronoid process from angle, 89; breadth of coronoid process above condyle, 62; length of condyle, 65; length of lower molar series, alveolar border, 58.

The Raccoon family includes the various forms of "Coons" (the animals so familiar to all the inhabitants of North America), such as the well-known Coati-mondis of South America (one species ranging

north into Mexico), the less familiar Cacamistl or Raccoon-foxes of the Pacific coast, and the Pottos or Kinkajous. All these are arboreal in their habits, for although they are very much at home upon the ground, they pass the larger portion of their time amid the branches, and make their nests, and bring forth their young in a hollow portion of a tree. The PROCYONIDÆ is not a large family, containing, at present, only a little over twenty-five species and races, of which about ten belong to the Raccoons and their allies, six to the Coatis, four to the Raccoon-foxes, and nine to the Kinkajous. They are all long-tailed animals, the majority having this member annulated in colors of strong contrast.

Fam. V. **Procyonidæ. Raccoons, Coatis,
Kinkajous, etc.**

Head broad behind, tapering rapidly forward to a narrow muzzle, which is sometimes elongate; ears moderate; feet plantigrade; soles naked, skin papillose; toes free, capable of being widely spread; claws curved, acute, non-retractile; tail moderately long, semi-bushy, generally annulated; body rather stout; legs moderately long.

Subfam. **Procyoninæ.**

American species have the alisphenoid canal wanting in the skull.

The handsome animals belonging to the first genus of the Family are found in the United States on the Pacific Coast from Oregon to Mexico, and also in various parts of the latter country, and are remarkable for the beauty of their tails, which are bushy and broadly ringed in black and white. In their structure the Raccoon-foxes are apparently allied to several families, and they have been assigned to various ones by different systematists, but now are generally placed with Raccoons and other members of the *Procyonidæ*. They live on small birds and mammals, insects, etc., make a moss-lined nest in the hollow of some tree, and have four young. The Raccoon-fox is easily tamed, and makes a pleasing pet, and as it is a good ratter, will soon clear a house of rats and mice. In appearance, with its short head, pointed muzzle, and projecting ears, it resembles the Fox, and in the loose pelage and ringed tail, the Raccoon.

91. **Bassariscus. Cacamistl. Raccoon-foxes.**

$$I. \frac{3-3}{3-3}, C. \frac{1-1}{1-1}, P. \frac{4-4}{4-4}, M. \frac{2-2}{2-2} = 40.$$

Bassariscus Coues, Science, 1887, p. 516. Type *Bassaris astuta* Lichtenstien.

Bassariscus (Licht.), Wagl., Isis, 1831, p. 512. (nec Hubner.)
Wagneria Jentink, Notes Leyd. Mus., 1886, p. 127, pls. IV, V.



FIG. 88. *BASSARISCUS ASTUTUS*.
No. 5503 Field Columbian Mus. Coll. Nat. size.

Head short, muzzle pointed, ears large; body slender, elongate; pads naked, soles hairy; tail long as body, annulate.

KEY TO THE SPECIES.

A. Size large.

	PAGE
a. Upper parts yellowish brown and gray; beneath white..... <i>B. astutus</i>	484
b. Upper parts blackish tawny..... <i>B. a. flavus</i>	485
c. Upper parts mixed dark brown and black; beneath buffy ochraceous..... <i>B. saxicola</i>	485
d. Upper parts smoky gray, lined with black; feet fawn gray..... <i>B. s. notinus</i>	485
e. Upper parts dark gray, hairs tipped with black; feet whitish..... <i>B. albipes</i>	486
B. Size small; above mixed black and golden brown; beneath yellowish white..... <i>B. annulatus</i>	487



FIG. LXVI. *BASSARISCUS ASTUTUS*. COMMON RACCOON-FOX.

479. *astutus* (*Bassariscus*), Licht., Wagler, Isis, 1831, p. 513. Elliot, Syn. N. Am. Mamm., 1901, p. 316.

COMMON RACCOON-FOX. *Cacomistl* in Mexico. *Cat Squirrel* in Texas.

Type locality. Southern Mexico.

Geogr. Distr. State of Mexico north to California.

Genl. Char. Body slender, elongate; muzzle pointed; tail long, bushy; claws half retractile. Skull long, slender; postorbital process of frontal bone short; upper sectorial with inner cusp much developed; anterior cusp of lower sectorial shortest.

Color. Above yellowish brown and gray mixed, below white; legs and feet like the body; tail white, with six or eight alternate black rings.

Measurements. Total length, about 720; tail to end of hairs, 360. Skull: occiput to incisors, 79; Hensel, 69; zygomatic width, 47; mastoid width, 35; occipito-sphenoid length, 35; interorbital constriction, 21.

a.—flavus (*Bassariscus*), Rhodes, Proc. Acad. Nat. Scien. Phil., 1893, p. 417. Elliot, Syn. N. Am. Mamm., 1901, p. 316.

TAWNY RACCOON-FOX.

Type locality. Texas.

Geogr. Distr. Northern Mexico near boundary line, into Texas.

Genl. Char. Smaller than *B. astutus*; tail shorter than body, often entirely encircled by the black rings.

Color. Above blackish tawny, darkest on median line; sides yellowish; beneath tawny, lightest on throat and neck; tawny spots above and below eyes and at ear.

Measurements. Total length, 680-800; tail, 304-380; hind foot, 55-60. Skull: total length, 80; greatest breadth, 50; interorbital constriction, 20; tip to tip of postorbital processes, 30.

480. saxicola (*Bassariscus*), Merr., Proc. Biol. Soc. Wash., XI, 1897, p. 185.

ESPIRITO SANTO RACCOON-FOX.

Type locality. Esperito Santo Island, Lower California, Mexico.

Geogr. Distr. Known only from type locality.

Genl. Char. Similar to *B. a. flavus*, but smaller.

Color. Above mixed drab brown and black; under parts pale buffy ochraceous; dark patch between eyes and nose, and a large one between eye and ear; tail with eight or nine black rings not meeting beneath; eight white triangles on under side.

Measurements. Total length, 737; tail vertebræ, 370; hind foot, 60.

sumichrasti notinus (*Bassariscus*), Thomas, Ann. Mag. Nat. Hist., 7th Ser., XI, 1903, p. 379.

BOQUETE RACCOON-FOX.

Type locality. Boquete, Chiriqui, Panama. Altitude, 6,000 feet.

Genl. Char. Teeth small; carnassial very small, internal lobe simple, supplementary cusps in middle of internal borders absent.

Color. General color smoke gray, lined with black; muzzle and orbital ring brown; dark line between eyes on forehead; cheeks and patch between eyes white; under parts dull buffy white, mixed with gray; upper surface of feet grizzled fawn gray, nearly black on the digits; tail with ten black rings alternating with white ones; tip black; ears brown on basal halves, apical halves paler, becoming white on the edges.

Measurements. Total length, 853; tail, 396; hind foot and claws, 89; ear, 45. Skull: greatest length, 87.3; basal length, 77; zygomatic breadth, 56; nasals, 16.6×6.5 ; interorbital constriction, 18; breadth of braincase, 35; palate length, 38; greatest diameter of fourth upper premolar, 7.5; of first upper molar, 8.5; of second upper premolar, 6; of first lower molar, 7.6; of second lower molar, 6.7.

481. albipes (*Bassariscus*), Elliot, Pub. Field Columb. Mus., III, 1903, p. 258. Zoölogy.

WHITE-FOOTED RACCOON-FOX.

Type locality. Near Vera Cruz, State of Vera Cruz, Mexico.

Genl. Char. Size large, color dark, feet white. Skull long, narrow, nasals pointed posteriorly (rounded in *B. astutus* and *B. a. raptor*), and considerably depressed in the middle, causing the outline to be concave, as the posterior portion ascends to the frontals; the braincase is rather narrow for its length, and does not widen posteriorly to an equal extent as that of *B. astutus*; the pterygoid fossa is long and rather broad, and the processes of the pterygoids are thickened and heavy, very different from the slender processes of the species compared; infraorbital foramina very large and triangular in shape; palate anteriorly much broader for its length than either of the other forms; postorbital processes short.

Color. Upper parts very dark gray, the hairs being yellowish at base and tipped with black, the dark color predominating to such an extent on the dorsal region that this part seems in certain lights all black; sides of neck and body slightly paler; top of head nearly black like the back, mixed slightly with white and buff hairs; above the eye for the posterior three-fourths is a buff spot connecting posteriorly with a buff stripe that runs under the eye to the nose; black band in front of eye; end of nose blackish brown; muzzle black; upper lip buff; chin and throat buff; rest of under parts yellowish white; shoulders like back; upper parts of fore and hind legs brownish gray; fore feet white or very pale yellowish white, this hue extending up the outside to beyond wrist; under side of legs yellowish white; hind

feet with terminal part and toes whitish; tail very long with alternating white and black rings and tip black; the black rings much broader than the white and not meeting beneath; ears, basal half black, remainder white; whiskers very long, jet black.

Measurements. Total length, 870; tail, 425; hind foot, 80. Skull: total length, 89; occipito-nasal length, 80; Hensel, 80; zygomatic width, 53; interorbital constriction, 17; postorbital constriction, 18; width across postorbital processes, 25.5; greatest width of braincase, 36; length of nasals, 20.5; mastoid width, 36; length of pterygoid fossa, 18; palatal length, 37.5; width of palate between last molars, 12; between canines, 10.5; length of upper tooth row from anterior edge of canine, alveolar border, 34; length of canine, 11; length of mandible, 55; height of coronoid process, 23; at angle, 9; length of lower molars series, alveolar border, 27; from anterior edge of canine, 34.

482. annulatus (*Paradoxurus*), Wagn., Schreb. Säugeth., Suppl., II, 1841, p. 353.

sumichrasti Sauss., Rev. Mag. Zoöl., 2me Sér., 1860, p. 7, pl. 1.

True, Proc. U. S. Nat. Mus., 1884, p. 608.

variabilis Peters, Monatsb. K. Preuss. Ak. Wiss. Berl., 1874, p. 704, pls. I, II.

monticola Cordero, La Nature, III, 1875, p. 269.

SOUTHERN RACCOON-FOX. *Tepachiche del Cofre de Perote, Cacomistl de Monte* in Mexico. *Muyus* in Guatemala.

Type locality. Unknown.

Geogr. Distr. Mexico to Costa Rica.

Genl. Char. Tail long, bushy, ringed; ears densely covered with hair.

Color. Above mixed black and golden brown, with grayish white hairs intermingled; nose and stripe to eye black, mixed with gray on nose; rest of head mixed black and yellow; under parts yellowish white; ears black externally, yellowish internally, edge reddish; tail reddish yellow, with nine to ten black rings, tip black.

Measurements. Total length, 420; tail, 190.

92. Bassaricyon.

$$I. \frac{3-3}{3-3}, C. \frac{1-1}{1-1}, P. \frac{3-3}{3-3}, M. \frac{3-3}{3-3} = 40.$$

Bassaricyon Allen, Proc. Acad. Nat. Scien. Phil., 1876, p. 20. Type *Bassaricyon gabbi* Allen.

Skull: Superior outline much curved, the anterior slope being very marked; braincase wide, large; temporal ridges separated; postorbital processes long, broad at base, pointed, the tips inclined back-

ward; auditory bullae inflated posteriorly, depressed anteriorly, converging posteriorly; interpterygoid fossa broad and rather short,

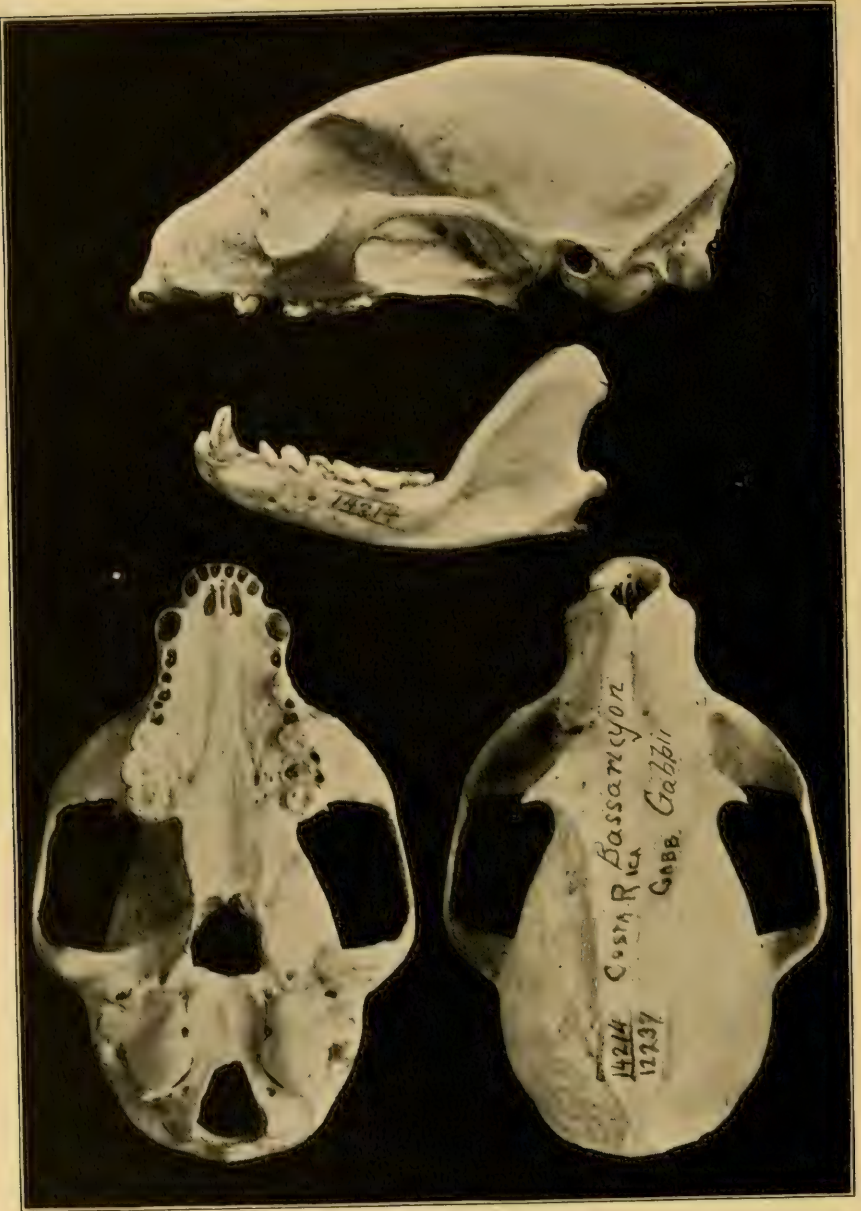


FIG. 89. BASSARICYON GABBI.

No. 14714 U. S. Nat. Mus. Coll. Type. Nat. size.

widest posteriorly; palate flat, long, and broad, with an azygos process in center of the arch; paroccipital and mastoid processes only slightly developed; molar depressed and expanded outwardly, forming a triangular plane beneath the orbit; zygomata widely expanded, the outer border nearly on a line with the skull's axis; nasals broad, rather short; mandible is nearly straight on inferior outline; coronoid process with the anterior border straight, its apex pointed; teeth similar to those of *Procyon*, but the canines are smaller, and the molars shorter; the last upper molar being subtriangular, with rounded inner and posterior outer angles.

483. gabbi (*Bassaricyon*), Allen, Proc. Acad. Nat. Scien. Phil., 1876, p. 20, pl. I.

GABB'S COON.

Type locality. Costa Rica.

Genl. Char. Those of the genus.

Color. Unknown.

Measurements. Skull: total length, 77.5; greatest width, 48.7; at mastoid processes, 33.2; interorbital width, 15; basal length, 73.7; length of upper molar series, 23; of lower molar series, 23.7; length of mandible, 55.

The animals contained in the next genus are so well known that they can be dismissed in a few words. The common species, *P. lotor*, is the type, and is a rather clumsy creature, stoutly built and slow of movement, with a thick, coarse coat of moderately long hair. It is omnivorous, feeds upon everything it can masticate, is strictly nocturnal, and is fond of resorting to the banks of lakes and streams. It is a good swimmer and expert fisher, and secures its finny prey by snatching it out of the shallows. The Raccoon hibernates in the hollow of a tree trunk or of some dead limb, where it passes the severest winter months, and the young are born in the spring, usually four or six in number. Coons are cleanly in their habits, and wash everything before eating, even shell-fish being so treated. It is a very cunning animal, and employs considerable strategy when escaping from its enemies, and is also most inquisitive, and exceedingly restless at all times except when asleep. There are several varieties, more or less closely resembling the type, and one species with shorter fur and a more slender body lives principally upon crabs, and derives its trivial name from those crustaceans.

93. *Procyon*. Raccoons.

$$I. \frac{3-3}{3-3}, C. \frac{1-1}{1-1}, P. \frac{4-4}{4-4}, M. \frac{2-2}{2-2} = 40.$$

Procyon Storr, Prodr. Meth., Mamm., 1780, p. 35, Tab. A. Type
Ursus lotor Linnæus.

Lotor Cuv. & Geoff., Mag. Encyclop., 1795, No. VI, Oken. Lehrb.

Naturg., 3ter Theil, 2te Abth., 1816, p. 1080.

Euprocyon Gray, Proc. Zool. Soc., 1864, p. 705.

Body stout; tail moderately long, semi-bushy, annulated; ears short, hairy; soles naked; muzzle acuminate.

KEY TO THE SPECIES AND SUBSPECIES.

- A. Tail bushy, short, ringed with black.
- a. Size small; hind foot less than four inches in length; teeth small. PAGE
 - a.' Shoulder patch normal in color. *P. pygmæus* 490
 - b.' Shoulder patch covered with black hairs. *P. maynardi* 490
 - b. Size large; hind foot over four inches in length.
 - a.' Fur long; teeth moderately large.
 - a." Pterygoids tapering anteriorly to a thin point. *P. l. hernandesi* 491
 - b." Pterygoids truncate anteriorly. *P. l. insularis* 492
 - b.' Fur short; teeth large, powerful (*Euprocyon*). *P. cancrivorus* 492

484. pygmæus (*Procyon*). Merr., Proc. Biol. Soc. Wash., XIV, 1901, p. 101.

LITTLE RACCOON.

Type locality. Island of Cozumel, Yucatan, Mexico.

Genl. Char. Similar to *P. l. hernandesi*, but much smaller.

Color. Above mixed black and gray, with a yellowish tinge on median line; transverse black bar across face, succeeded above by a whitish one with a median dusky line; chin, lips, and sides of throat whitish; dusky band across throat; under parts grizzled gray, tinged with yellowish; tail yellowish, with six or more dark brown rings rather faint on the under side; ankles dusky; hands and feet grayish, the latter suffused with brown.

Measurements. Total length, 667; tail vertebræ, 230; hind foot, 90. Skull: basal length, 88; occipito-nasal length, 88; palatal length, 58; zygomatic breadth, 59; length of upper molar series, 17.

485. maynardi (*Procyon*). Bangs, Proc. Biol. Soc. Wash., XII, 1898, p. 92.



PROCYON L. HERNANDEZI.

No. 8681 Field Columbian Mus. Coll. $\frac{3}{4}$ nat. size.

MAYNARD'S RACCOON.

Type locality. New Providence Island, Bahama Islands.

Genl. Char. "Size small; palatine extension short and narrow; upper carnassial molar teeth small and less square than in *P. lotor*, less truncate on inner sides, and more pointed; molar slender, weak; infraorbital foramen large."

Color. Like *P. lotor*; shoulder patch paler, with more black hairs.

Measurements. "Total length, 623; tail vertebrae, 210; hind foot, 96. Skull: length of nasals, 28.6; length of palate, 58.2; width of palate, at middle of carnassial tooth, 17.2; length of palatine, extension from a line across alveoli of last upper molars to end of pterygoid process, 23.8; to end of palate, 12.6; least width of palatine extension, 13.6; length of single half of mandible, 72.2." (Bangs, l. c.)

lotor hernandezii (*Procyon*), Wagl., Isis, 1831, p. 514. Elliot, Syn.

N. Am. Mamm., 1901, p. 317.

psora. Gray, Mag. Nat. Hist., 1837, p. 261.

nivea. Gray, Mag. Nat. Hist., 1842, p. 580.

HERNANDEZ'S RACCOON. *Tejon solitario*, Apache in Mexico.

Type locality. Southern Mexico.

Geogr. Distr. Southern Mexico, north into United States, west of Mountains to Puget Sound.



FIG. LXVII. *PROCYON L. HERNANDEZII*. HERNANDEZ'S RACCOON.

No. 8724 Field Columbian Mus. Coll.

Genl. Char. Size large; tail tapering, and the black rings only half as wide as the rusty whitish interspaces; hind feet exceeding four inches, above dark brown.

Color. Similar to *P. lotor*, but black tail rings narrow, and size generally larger.

Measurements. Total length, 533; tail, 143; ear, 35; hind foot, 112; fore foot, 60. Skull: occipito-nasal length, 100; Hensel, 98; zygomatic breadth, 67.5; interorbital width, 30; posterior margin of palate to alveoli of incisors, 65; mastoid breadth, 55; length of mandible, 80; height at condyle, 17.

lotor insularis (*Procyon*), Merr., Proc. Biol. Soc. Wash., XII, 1898, p. 17.

ISLAND RACCOON.

Type locality. Maria Madre Island, Tres Marias Islands, State of Jalisco, Mexico.

Geogr. Distr. Tres Marias Islands, State of Jalisco, Mexico.

Genl. Char. Similar to *P. lotor*; pterygoids truncate anteriorly.

Color. Like *P. lotor*, but paler; top of head grayer.

Measurements. Total length, 854; tail vertebræ, 286; hind foot, 132.

A. *Euprocyon* Gray

Superior surface of skull flat, declining gradually from lambdoidal suture to nasals, and rather abruptly at occipital region; braincase broad, swollen, and rounded on sides; roots of upper canines producing considerable swelling in malar; palate long and hard, post-palatal length short; interpterygoid fossa short and broad; bullæ large, placed slightly oblique, longer than wide, high; teeth very large; tail rather long, slender.

486. *cancrivorus* (*Ursus*), Cuv., Tabl. Élem. Hist. Nat., 1798, p. 113.
CRAB-EATING RACCOON.

Type locality. Cayenne, French Guiana.

Geogr. Distr. Tres Marias Islands, State of Jalisco, Mexico (Alston), Panama; Northern South America.

Genl. Char. Tail slender, not bushy; teeth large; fur thick, short.

Color. Space around eye and top of nose black; rest of head yellowish gray, lined with black; dorsal region yellowish brown lined with black, and hairs in center of back tipped with whitish, giving a grayish sheen to this part; shoulders, sides, and thighs clear buffy brown, grading into the yellowish white of the under parts; chin brownish black; legs sparsely haired, brownish black; feet brownish

gray; ears yellowish; tail yellowish white with seven or eight narrow black rings; tip black.

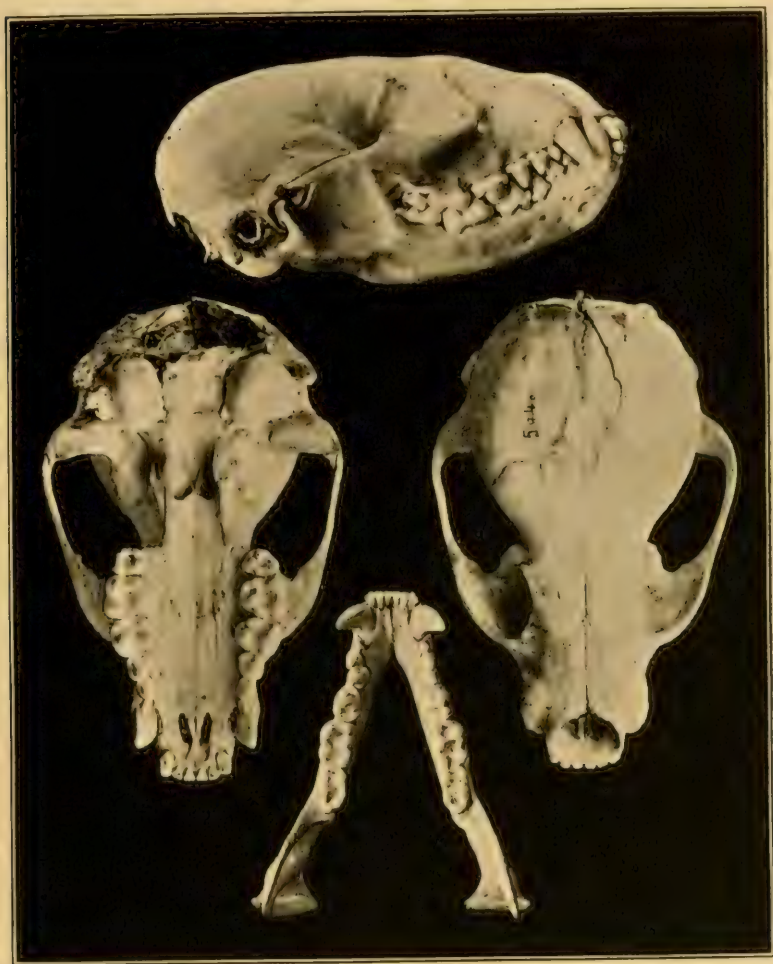


FIG. 90. PROCYON (EUPROCYON) CANCRIVORUS.

No. 5940 Am. Mus. Nat. Hist. Coll. $\frac{1}{2}$ nat. size.

Measurements. Total length about 825; tail, 250; hind foot, 140 (dried skin). Skull: occipito-nasal length, 106; Hensel, 116; zygomatic width, 77; interorbital constriction, 26; median length of nasals, 26; mastoid breadth, 58; alveolus of incisor to palatal arch, 72; length of mandible, 93; height at condyle, 19.

The Coatis are chiefly arboreal in their habits, and are remarkable for the lengthened, flexible nose, which is capable of movement in almost any direction, and also of being made perfectly rigid at the will of the animal. Three species and six subspecies only are known, resembling each other somewhat in the color of their coat, which is, however, even in individuals of the same species, liable to assume a great variety of hues wholly independent of age or sex, and which range from a reddish brown and orange to pale brown. Like the other members of the family, the Coati-Mundis, as they are sometimes called, are omnivorous, and eat birds, mammals, insects, fruit, or in fact almost anything they can get. They go in small bands of a dozen or more, but sometimes an old male may be seen by himself, if it is not in the pairing season; but females are never found alone. It is an inquisitive animal and pries with its long nose or claws into everything that attracts its attention, and like the coon, is very mischievous and always busy and restless. The long tail, though not prehensile, is sometimes used to draw objects within reach of its paws. The various species range over a great extent of country, and are found from Mexico to Paraguay in South America, and from the Atlantic Coast to the Andean range.

94. *Nasua*. Coatis.

$$I. \frac{3-3}{3-3}; C. \frac{1-1}{1-1}; P. \frac{4-4}{4-4}; M. \frac{2-2}{2-2} = 40.$$

J. A. Allen. *On the genus Nasua* Storr, Bull. U. S. Geogr. & Geol. Surv. Terr., v, 1879, p. 153.

Nasua Storr, Prodr. Meth. Mamm., 1780, p. 35. Type *Viverra nasua* Linnæus.

Nose lengthened, snout truncate, upturned; body long, compressed; tail long, tapering; Skull long, narrow, nasals upturned anteriorly; no interorbital constriction; palate very long, one-third of its length posterior to last molar; interpterygoid fossa very short, broad; bullæ small.

KEY TO THE SPECIES AND SUBSPECIES

	PAGE
A. Size small; tail short; first upper molar cut away anteriorly and posteriorly.....	<i>N. nelsoni</i> 495
B. Size large; tail long; first upper molar not cut away at either end.	
a. Upper parts dark reddish brown; molariform teeth medium.....	<i>N. nasica</i> 497
b. Upper parts reddish brown; molariform teeth large.....	<i>N. n. molaris</i> 497

	PAGE
c. Upper parts brownish black..... <i>N. n. bullata</i>	497
d. Upper parts rusty brown..... <i>N. n. panamensis</i>	498
e. Upper parts pale brownish yellow..... <i>N. n. yucatanica</i>	498
f. Upper parts pale brown..... <i>N. n. pallida</i>	498

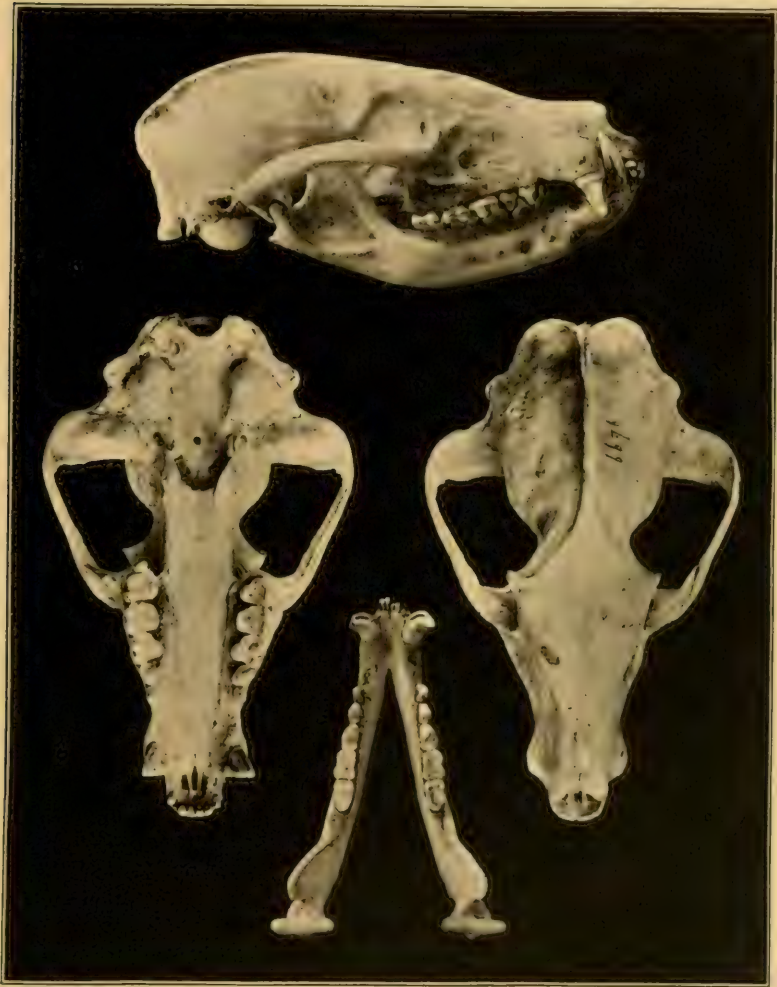


FIG. 91. NASUA NASICA.

No. 6676 Am. Mus. Nat. Hist. Coll. $\frac{1}{2}$ nat. size.

487. **nelsoni** (*Nasua*), Merr., Proc. Biol. Soc. Wash., xiv, 1901, p. 100. (July.)

thersites (*Nasua*), Thomas, Ann. Mag. Nat. Hist., 7th Ser., VIII, 1901, p. 271. (October.)

NELSON'S COATI.

Type locality. Cozumel Island, Yucatan, Mexico.

Genl. Char. Small; tail short. Skull: sagittal crest large in male, arched; inner cusp of first upper molar prominent; first lower molar small and narrow.

Color. Head and shoulders golden fulvous; sides of neck and arms buffy white; throat buffy; ears and a posterior stripe whitish; chin and nose grayish; superciliary stripe gray; dusky band behind chin; rest of body above, with belly, legs, and tail seal brown.

Measurements. Total length, 795-910; tail vertebrae, 355-380; hind foot, 77-83; ear, 28. Skull: basal length, 95-109; occipito-nasal length, 95; interorbital breadth, 24; palatal length, 66-67; zygomatic breadth, 61-64; length of molar series, on alveoli, 16.5.



FIG. LXVIII. NASUA NASICA. COATI.

488. **nasica* (*Nasua*), Linn., Syst. Nat., 1, 1766, p. 64.

COATI. *Pisoti*, *Tejon* in Spanish America; the latter name also for *Procyon l. hernandezi*.

Type locality. "In America."

Geogr. Distr. Mexico from northern boundary through Central America.

Genl. Char. Those of the genus.

Color. Very variable; usually ranging from reddish brown to chestnut.

Dark reddish brown, hairs tipped with yellowish white, this last color predominating on shoulders, back, upper part of fore legs, and front edge of hind legs and belly; head pale yellowish brown, becoming pale rufous on occiput and upper part of neck; face rufous brown; white spot beneath eye; nose white, muzzle black; chin, throat, under part of neck and breast yellowish white; tail uniform light reddish brown, darkest at tip; feet blackish chestnut.

Measurements. Total length, 1225; tail, 575; hind foot, 120. Skull: occipito-nasal length, 123; Hensel, 122; zygomatic width, 82; interorbital width at postorbital processes, 39; median length of nasals, 20; palatal arch to alveoli of incisors, 82; postpalatal length, 39; length of upper molar series, 23; length of mandible, 38; height at coronoid process, 26. (Skull dimensions from a specimen from San Felipe de Hajar, State of Jalisco, Mexico, No. 6676, Coll. Am. Mus. Nat. Hist., N. Y.)

a.—molaris (*Nasua*), Merr., Proc. Biol. Soc. Wash., xv, 1902, p. 68. MANZANILLO COATI.

Type locality. Manzanillo, State of Colima, Mexico.

Genl. Char. "Similar to *N. narica* (*sic*) from eastern Mexico, but gray of face more restricted; tail longer; skull slightly larger; molariform teeth, particularly the upper ones, very much larger and more massive."

Measurements. "Total length, 1240; tail vertebræ, 680; hind foot, 122." (Merr., l. c.)

b.—bullata (*Nasua*), Allen, Bull. Am. Mus. Nat. Hist., 1904, p. 48. DARK COATI.

Type locality. Pozo Azul, Pirris Province, Costa Rica.

Genl. Char. General color very dark; bullæ greatly inflated; teeth small.

Color. Head and dorsal region brownish black, hairs tipped with yellowish; sides dark brown; throat and chest whitish; ventral sur-

**NASICA* long-nose, nec *naria* *narinosa*, broad nose.

face dark brown, tips of hairs lighter; tail above dark brown, sides and beneath lighter, nearly black at tip.

Measurements. Total length, 1119; tail vertebræ, 587; hind foot, 133. Skull: occipito-nasal length, 140; Hensel, 123; zygomatic width, 78; interorbital constriction, 28; width of braincase, 45; length of upper molar series, 26; bullæ, 17×11 ; height of sagittal crest, 6.

c.—*panamensis* (*Nasua*), Allen, Bull. Am. Mus. Nat. Hist., 1904, p. 51.

BOQUERON COATI.

Type locality. Boqueron, Chiriqui, Panama.

Genl. Char. Similar to *N. n. bullata*, but smaller.

Color. Top of head, nape, and shoulders rusty brown; anterior half of back and rump dusky brown, hairs tipped with yellowish gray; ears and sides of shoulders yellowish white; feet and tail dark brown.

Measurements. Total length, 1080; tail vertebræ, 540; hind foot, 116; ear, 40. Skull: occipito-nasal length, 122; Hensel, 108; zygomatic width, 60; interorbital constriction, 25; width of braincase, 44.5; length of upper molar series, 21; bullæ, 13×9.5 .

d.—*yucatanica* (*Nasua*), Allen, Bull. Am. Mus. Nat. Hist., 1904, p. 52.

YUCATAN COATI.

Type locality. Chichen Itza, Yucatan.

Genl. Char. Size small; color pale.

Color. Upper parts pale brownish yellow, tips of hairs brownish over posterior portion of dorsal region, and yellowish white on shoulders; sides of shoulders and neck, and proximal two-thirds of fore limbs pale cream-color; dark areas of face, and the fore and hind feet dark chocolate brown; ventral surface pale reddish brown, tips of hairs whitish; tail pale buff above and beneath, brownish at tip.

Measurements. Total length, 1150; tail vertebræ, 550; hind foot, 100. Skull: occipito-nasal length, 130; basal length, 120; zygomatic width, 77; interorbital constriction, 29; width of braincase, 43; length of upper molar series, 18; length of lower molar series, 23.3; height at sagittal crest, 6.5; bullæ, 14.6×10 .

e.—*pallida* (*Nasua*), Allen, Bull. Am. Mus. Nat. Hist., 1904, p. 53.
PALLID COATI.

Type locality. Near Guadalupe y Calva, Sierra Nevada, State of Chihuahua, Mexico.

Color. "Above pale brown, hairs for three-fourths their length from base buffy white, then broadly ringed with dark brown, and

tipped with pale yellowish; inner surface of ears, light facial markings, sides of neck and shoulders, and proximal two-thirds of fore limbs white; flanks and ventral surface brighter than back; dark facial markings pale chocolate brown; tail pale brownish yellow; feet dark brown."

Measurements. Total length, 1200; tail vertebrae, 515 (flat skin).

One species and eight subspecies of the next rather aberrant genus are known. Unlike its relatives of the previous genera, the Kinkajou has a prehensile tail, which it can coil round a branch and render its position in a tree most secure. With its hind feet it is very dexterous, and can with them easily place food in its mouth; and although there are no opposable thumbs on the hands, and its fingers are webbed for almost their entire length, these peculiarities offer no obstacles for the expert use of these members. It is a rather small animal, the body being only about a foot and a half in length, head broad and round, limbs short, and the tail long. It walks with the soles of both hands and feet upon the ground, but the heels are raised. It is arboreal, a facile climber, and when descending a tree or branch comes as often head first as in any other manner. It is fond of insects, which it draws from their retreats with its long and flexible tongue, and is very fond of the honey of the wild bee. Nocturnal in habits, it avoids the light, and is rarely seen by day, but becomes very active at nightfall. It has a gentle disposition, and is easily tamed, although in the wild state it is said to be fierce enough. Two of the subspecies only are found within the limits embraced in this work.

95. Potos. Kinkajous.

$$I. \frac{3-3}{3-3}, C. \frac{1-1}{1-1}, P. \frac{3-3}{3-3}, M. \frac{2-2}{2-2} = 36.$$

Oldfield Thomas. *On the Geographical Races of the Kinkajou*. Ann. Mag. Nat. Hist., 7th Ser., IX, 1902, p. 265.

Potos Cuv. & Geoff., Meth. Mamm., in Mag. Ency., II, 1795, p. 187. Type *Viverra caudivolvula* Schreber.

Cercoleptes Illiger, Prodr. Syst. Mamm. et Av., 1811, p. 127.

Skull short, upper surface flat; molars have crowns flat, tubercles slight; tongue long, extensile; ears and limbs short; body long; tail long, tapering, prehensile.

KEY TO THE SUBSPECIES.

		PAGE
A. Tail long, prehensile.		
a. Color pale, grayish yellow	<i>P. f. aztecus</i>	500
b. Color brownish yellow and black	<i>P. f. chiriquensis</i>	501



FIG. 92. POTOS FLAVUS.

No. 8611 Field Columbian Mus. Coll. $\frac{2}{3}$ nat. size.

flavus aztecus (Potos), Thomas, Ann. Mag. Nat. Hist., 7th Ser., ix, 1902, pp. 266, 268. Desc.

AZTEC KINKAJOU. *Martica* in Mexico; *Micoleon* in Guatemala.

Type locality. Atoyca, State of Vera Cruz, Mexico.

Geogr. Distr. Central Mexico, south to Guatemala.

Genl. Char. Size large; no dorsal stripe.

Color. Muzzle and space around the eyes dark brown; head and body above grayish yellow; under parts and inner sides of limbs deep fulvous yellow, with a dark streak on abdomen; hands and feet brownish; tail above grayish yellow, lighter beneath, tip brown.



FIG. LXIX. POTOS FLAVUS. THE KINKAJOU.

Measurements. Total length, 1015; tail, 435; hind foot with claws, 100; ear, 38. (Skin, probably stretched.) Skull: greatest length, 94; basal length, 83; zygomatic breadth, 66; interorbital breadth, 22.5; breadth of braincase, 44; palatal length, 40; upper tooth row, 21.6; lower tooth row, inclusive of canines, 24; length of upper molar series, 14; lower molar series, 16.3; height of mandible at coronoid process, 46.7.

flavus chiriquensis (Potos), Allen, Bull. Am. Mus. Nat. Hist., 1904, p. 72.

CHIRIQUEI KINKAJOU.

Type locality. Boqueron, Chiriqui, Panama.

Color. Above brownish yellow, hairs tipped with blackish; middle of back darker, but no dorsal line; sides of neck and shoulders and front of neck yellowish or golden rufous; under parts dull greenish yellow, with a dusky brown streak on middle of abdomen; tail above like back for four-fifths its length, beneath dull brownish yellow, apical portion brownish black.

Measurements. Total length, 815-990; tail vertebræ, 425-505; hind foot, 75-93; ear, 36-42. Skull: occipito-nasal length, 92; basal

length, 83; zygomatic width, 59; interorbital constriction, 21.5; width of braincase, 41; palatal length, 31.5; length of upper pre-molar and molar series, 20; length of lower premolar and molar series, 23; length of mandible, front base of incisors to posterior border of condyle, 61; height of condyle, 30; at coronoid process, 43.5.

The family MUSTELIDÆ is a large one and widely distributed over the earth. It is composed of many genera containing species that differ greatly in structure and habits, some dwellers of the plains, others of the woods, and still others which are aquatic, whose home is in the rivers, lakes, and seas, from which their subsistence is obtained. It is from the members of this family that the most valuable furs are procured. The majority of the species are dwellers in the northern parts of the earth, only a few being inhabitants of the region of which this work treats. Most species of the Mustelidæ have the capacity of secreting, and also of discharging, sometimes to a considerable distance, a fetid substance which proves a most effective means of defense. The glands which form the secretory apparatus are most highly developed in the *Mephitinæ*. So varied are the MUSTELIDÆ that any arrangement of the different forms cannot be otherwise than highly artificial, some of the gaps between the genera being wide and important.

Fam. VI. **Mustelidæ. Badgers, Weasels, Otters, etc.**

A single tubercular molar tooth on each side of both jaws; in the upper molar the inner tubercular portion is longest in the antero-posterior direction; bullæ slightly inflated; palate extending beyond the last molars; feet five-toed, plantigrade or digitigrade; no cæcum.

The Badger, representing the first genus of the subfamily, is eminently a digger, and lives in a burrow from which it rarely ventures any distance by day. Its short legs and broad, flat body give it the appearance when running of almost sweeping the ground. Its movements are slow, and if it imagines it can escape notice, it will remain motionless, crouching as low as possible, and at such a time a near approach is not impossible. The Badgers of Europe and America, although they resemble each other somewhat in outward appearance, differ so much in teeth and shape of skull that they cannot even be included in the same genus. The American typical species is an inhabitant of the more northern and western portion of

North America, while the two races that are found in Mexico differ very materially in their markings and also in color. The burrows made by these animals are often extensive, and in loose soil are twenty feet or more in length; and as the animal digs with wonderful rapidity, it does not take it long to construct such a burrow and bury itself out of sight. Badgers are chiefly nocturnal and omnivorous, eating mammals, birds, reptiles, insects, fruits, in fact anything they may obtain that can be regarded as food. They are very ferocious, and great fighters when cornered, but their first idea when an enemy appears is to get back to the burrow as quickly as possible, and an individual never leaves this haven of refuge unless everything is quiet and no enemy in sight. So great is this animal's strength that the largest dog would find it difficult, if not impossible, to pull a badger out of his burrow, as it grasps the sides with feet and nails, and becomes about as immovable as the walls themselves. It has hardly any enemy but man that it need fear, its great strength and facility in digging affording it means of rapid escape from any carnivorous beast that dwells in the same region. Badgers hibernate in high latitudes.

Subfam. I. **Melinæ.**

Large quadrate posterior upper molar; molars in jaws unequal.

96. Taxidea. Badgers.

$$I. \frac{3-3}{3-3}; C. \frac{1-1}{1-1}; P. \frac{3-3}{3-3}; M. \frac{1-1}{1-1} = 32.$$

Taxidea Waterh., Proc. Zool. Soc., 1838, p. 154. Type *Melcos labradoria* Gmelin.

Body stout, strong, depressed; tail short; upper carnassial longest in proportion to other teeth, upper molar triangular, the apex turned backward; fore claws very large, strong; skull wedge-shaped, widest posteriorly; limbs short, feet sub-plantigrade; anal glands two; sub-caudal pouch surrounded by a racemose gland.

KEY TO THE SUBSPECIES.

A. White median stripe from nose to tail.

- | | | |
|--|--------------------------|-------------|
| a. Black interramial spot; under parts of body buff..... | <i>T. t. berlandieri</i> | PAGE
503 |
| b. No interramial spot; under parts of body tawny white..... | <i>T. t. infusca</i> | 505 |

taxus berlandieri (*Taxidea*), Baird, Mamm. N. Amer., 1857, p. 205.
Elliot, Syn. N. Am. Mamm., 1901, p. 321.



FIG 93. *TAXIDEA T. BERLANDIERI*.
No. 6879 Field Columbian Mus. Coll. $\frac{1}{2}$ nat. size.

BERLANDIER'S BADGER. *Taxon*, *Teton*, in Mexico.

Type locality. Llano Estacado, Texas, near Mexican border.

Geogr. Distr. State of Tamaulipas, Mexico, north to Texas, Oklahoma Territory, Arizona, and New Mexico.

Genl. Char. A conspicuous white stripe from nose along the entire upper part of body to the tail; black interramial spot.

Color. Reddish gray; blackish brown on head, and the same color on neck and back along the median white stripe, the hairs tipped with white, giving this part a grizzled appearance; cheeks



FIG. LXX. TAXIDEA T. BERLANDIERI. BERLANDIER'S BADGER.

white, with a black patch in front of ear; under parts buff, except throat and chin, which are white; legs black; tail like the back.

Measurements. Total length, 710; tail, 120; hind leg, 103. Skull: occipito-nasal length, 106; Hensel, 109; zygomatic width, 45; inter-orbital constriction, 26; palatal arch to alveoli of incisors, 60; post-palatal length, 49; length of bullæ, 27; mastoid width, 39; median length of nasals, 23; greatest occipital breadth, 74; length of upper tooth row, 32.5; length of crown of sectorial, 14; length of mandible, 80; height at condyle, 16.

taxus infusca (*Taxidea*), Thomas, Proc. Zool. Soc., 1867, p. 899.
LOWER CALIFORNIA BADGER.

Type locality. Santa Anita, Lower California, Mexico.

Geogr. Distr. Known only from the type locality.

Genl. Char. Similar to *T. t. berlandieri*, but darker; no inter-ramial black spot.

Color. "Pattern apparently as in *T. t. berlandieri* Baird, but the general color as much darker than in that animal as that of *T. t.*

neglecta Mearns, is when compared with *T. t. typica*; mesial stripe broad and well marked throughout from nose to tail, specially broadened on the nape, where it reaches a width of from $1\frac{1}{2}$ to 2 inches; black cheek-patch not united to orbital patch, and only doubtfully connected by gray with the black crown-band; long hair of back without sub-basal bands, uniformly tawny buff except for the sub-terminal band of black and tip of dirty white; tail hairs similar, except those of the extreme tips, which are blackish brown throughout; under surface brownish or tawny white; mesial line clear white."

Measurements. "Total length, 702; tail vertebræ, 122; hind foot, 94; ear, 50. Skull: length of Hensel, 113; greatest breadth, 79." (Thomas, l. c.)

Skunks are nocturnal in their habits and are not very often seen abroad by day. Slow of movement, incapable of running with any degree of speed, its teeth and claws comparatively feeble, the skunk would be one of the most helpless and defenseless of creatures if it were not for the terrible battery it carries ever ready to be discharged, and before whose overpowering fetid odor the boldest animal hastens to escape. So penetrating and permeating is this dreadful scent, that it can be detected at the distance of a mile, and if the liquid reaches the eye it is intensely irritating and painful, and may cause the loss of sight. The Skunk is a very cleanly animal, and is careful not to get any of the discharge upon its own fur, lifting its bushy, ornamental tail high over its back far out of harm's way. This movement is a provision of Nature, for it acts upon certain muscles, and causes them to compress the sacs containing the fluid and give an increased force to the discharge. It is stated that if a skunk is seized and held up by its tail it is harmless, but few persons would take the chances and try the experiment to prove if this is really a fact. The distance the fluid can be ejected is about ten feet. Skunks are omnivorous, eating almost anything that they can masticate, and often approach buildings in the country in search of food, frequently taking up their abode beneath the porch, or in the cellar, which they reach by digging. Their presence is soon evident, and they prove most unwelcome visitors. The bite of the skunk is severe, and it has been proved that it can inflict hydrophobia, but there is no authenticated instance of a rabid skunk, and the cause for this fearful result is a mystery. Skunks live in burrows, and are expert diggers of these subterranean abodes, and they hibernate during the winter. There are numerous so-called species and races very much

alike in appearance and habits. The skunk is not what may be called gregarious, but frequently a family of five or six may be seen together; more often, however, only single individuals are met with. It is a handsome animal, and the tail is really beautiful, with its long, flowing black and white hairs waving like a plume. The litters are large, six to eight, possibly occasionally more young are produced at a birth, and these generally remain underground until able to take care of themselves.

97. *Mephitis*. Skunks.

$$I. \frac{3-3}{3-3}; C. \frac{1-1}{1-1}; P. \frac{2-2}{3-3}; M. \frac{1-1}{2-2} = 34.$$

A. H. Howell, *Revision of the Skunks of the genus Chinch*a, N. Am. Faun., No. 20, 1901.

J. A. Allen, *The Generic names of the Mephitinæ*, Bull. Am. Mus. Nat. Hist., 1901, p. 325. *Id.* Proc. Biol. Soc. Wash., xv, 1902, pp. 59-66.

Mephitis Cuv., *Leçons, d'Anat. Comp.*, Class Mamm., 1, 1800, Tabl.

1. Type—? "Les Moufettes."

*Chinch*a Less., *Nouv. Tabl. Règn. Anim.*, Mamm., 1842, p. 67.

Leucomitra Howell, N. Am. Faun., No. 20, p. 39, pls. IV, VIII.

Upper posterior molar larger than the carnassial, subquadrate; palate reaching to hinder border of last molar; body elongate; limbs moderate, subplantigrade; head small, nose pointed; tail long, bushy; anal glands greatly developed.

KEY TO SPECIES AND SUBSPECIES.

A. Audital bullæ not greatly inflated; divided white stripe on back.	PAGE
a. Body stripes narrow..... <i>M. o. holzneri</i>	507
b. Body stripes very broad..... <i>M. m. estor</i>	509
B. Audital bullæ greatly inflated; back all black or all white.	
a. Bullæ small.	
a.' Tail longer than body..... <i>M. macrura</i>	510
b.' Tail not longer than body..... <i>M. m. milleri</i>	511
b. Bullæ large..... <i>M. m. vittata</i>	512

occidentalis holzneri (*Mephitis*), Mearns, Proc. U. S. Nat. Mus., xx, 1897, p. 461.

LOWER CALIFORNIA SKUNK.

Type locality. San Isidro Ranch, Lower California, Mexico, near border of San Diego County, California.



FIG. 94. MEPHITIS O. HOLZNERI.
No. 6421 Am. Mus. Nat. Hist. Coll. Nat. size

Geogr. Distr. Monterey Bay, south into Lower California, Mexico;
southern limits unknown.

Genl. Char. Similar to *M. occidentalis*, but smaller; mastoids less prominent; rostrum and palate longer; lateral tooth row and width of molars greater.

Color. Black; stripe on top of head, triangular patch on nape and two narrow stripes to middle of tail, white; rest of hairs on tail black with white bases.

Measurements. Total length, 665; tail vertebræ, 273; hind foot, 72. Skull: basal length, 66.9; Hensel, 64.5; greatest zygomatic width, 47.4; mastoid width, 38.7; width at postorbital processes, 22.2; interorbital constriction, 19.1; palatal length, 27.3; postpalatal length, 27.2.

mesomelas estor (*Mephitis*), Merr., N. Am. Faun., No. 3, 1890, p. 81 pl. x, fig. 1. Elliot, Syn. N. Am. Mamm., 1901, p. 326.

MERRIAM'S SKUNK.

Type locality. San Francisco Mountain, Coconino County, Arizona.

Geogr. Distr. States of Sonora and Chihuahua, Mexico, into Arizona.

Genl. Char. Size small; tail short; soles naked. Skull: palate not reaching posterior line of the last molar; distinct pit between the bullæ and postglenoid process absent.

Color. Narrow frontal stripe and nuchal patch white, the latter occupying entire occipital region, and extending narrowly on the shoulders, then expanding over all the lower back and rump (sometimes in the center of the back a narrow black stripe appears amid the white), and then continues over the tail extending beyond the tip. Through this thin white "veil" the black beneath shows. Under parts black with white patches on throat.

Measurements. Total length, 640; tail vertebræ, 256; pencil, 140; hind foot, 67. Skull: occipito-nasal length, 60; Hensel, 53.5; zygomatic width, 40; width of orbital processes, 21; palatal length, 22; postpalatal length, 32; length of nasals, 10; width of upper molar, 8; length of mandible, 42; height at coronoid process, 19.

A. *Leucomitra*.

Skull: Anterior palatine foramina large, rounded; audital bullæ much inflated; zygomata often nearly parallel to the skull; paroccipital processes directed outward, pointed; posterior margin of palate even. Size medium, form slender; hairs of nape lengthened, directed laterally, shaping a hood.



FIG. 95. *MEPHITIS (LEUCOMITRA) MACRURA*.
No. 8682 Field Columbian Mus. Coll. Nat. size.

489. *macrura* (*Mephitis*), Licht., Darst. Säugeth., 1834, pl. XLVI.

LONG-TAILED SKUNK. *Zorillo* in Mexico, applied to all skunks.

Type locality. "Mexico."

Genl. Char. Tail nearly as long as body.

Color. Black; a broad nuchal patch extending as a broad stripe to end of tail white; longitudinal white stripe on each side.

Measurements. Total length, 685; tail vertebrae, 332. Skull:

occipito-nasal length, 57; Hensel, 53; zygomatic width, 38; palatal length, 22; length of upper molar, 6; length of mandible, 38; height at coronoid process, 18.



FIG. LXXI. MEPHITIS MACRURA. LONG-TAILED SKUNK

a.—milleri (*Mephitis*), Mearns, Proc. U. S. Nat. Mus., xx, 1897, p. 467. Elliot, Syn. N. Am. Mamm., 1901, p. 325.

MILLER'S SKUNK.

Type locality. Fort Lowell, near Tucson, Pima County, Arizona.

Geogr. Distr. State of Sonora, Mexico, into Arizona.

Genl. Char. Tail slender, longer than head and body; nape with a hood of spreading elongated hairs.

Color. Black with a white stripe low down on the sides from the ear to the tail; head with a narrow white stripe above; tail externally black above and all around subterminally; under side all white, except the terminal black ring; tuft at tip white; feet and under parts black.

Measurements. Total length, 790; tail vertebræ, 435; hind foot, 73. Skull: total length, 60.3; Hensel, 58.4; zygomatic width, 43.9; mastoid breadth, 36; across postorbital processes, 22.3; interorbital constriction, 19.4; palatal length, 24.1; postpalatal length, 34.2.

b.—vittata (Mephitis), Licht., Darst. Säugeth. 1834, p. 34, pl. XLVII. *concolor* Gray, Proc. Zool. Soc., 1865, p. 149.

BRIDLED SKUNK. *Zorillo* in Guatemala.

Type locality. San Mateo del Mar, State of Oaxaca, Mexico.

Geogr. Distr. State of Oaxaca, Mexico; range unknown.

Genl. Char. "Narrow line from nose to vertex; one or two streaks on each side along the occiput; a solitary stripe on each side from the paratoid region to the base of the tail." Smaller than *M. macrura*; mastoids and sagittal crest only slightly developed.

Color. Same as *M. macrura*, but pencil of tail not clearly indicated; black phase existing and not uncommon.

Measurements. Total length, 610; tail vertebræ, 280. Skull: total length, 52.3; Hensel, 50.5; zygomatic breadth, 38.3; mastoid breadth, 31.8; across postorbital processes, 20.6; palatal length, 21.2; postpalatal length, 29.3.

The species of the next genus are among the largest of the skunks, indeed some individuals probably exceed all other skunks in size. In structure they differ from species of the genus *Mephitis* in being heavier in body, with an elongate snout more like that of a pig. The fur is coarse and harsh, and the entire back is often pure white, the dorsal stripes having united, but in others again the color of the upper parts resemble that of the true skunks.

98. Conepatus. White-backed Skunks.

$$L_{\frac{3-3}{3-3}}, C_{\frac{1-1}{1-1}}, P_{\frac{2-2}{3-3}}, M_{\frac{1-1}{2-2}} = 32.$$

Conepatus Gray, Charlesw. Mag. Nat. Hist., 1837, p. 581. Type

Conepatus humboldti Gray.

Ictonyx (sic) Kaup. Thierr., 1, 1835, p. 352.

Marputius Gray, Charlesw. Mag. Nat. Hist., 1837, p. 581.

Thiosmus Lichtenstein, Abh. K. Akad. Wiss. Berl., 1838, p. 270.

Ozolictis Gloger, Hand-und Hilfsb. Naturg., 1841, p. 57.

Rhinozolis Gloger, Hand-und Hilfsb. Naturg., 1841, p. 58.

Oryctogale Merr., Proc. Biol. Soc. Wash., 1902, p. 161.

Body stouter than that of *Mephitis*; nostrils opening downward and forward, not laterally; first premolar absent; pterygoid fossa short and rather narrow; palate extending beyond posterior border of molar; postorbital processes generally absent; superior outline of

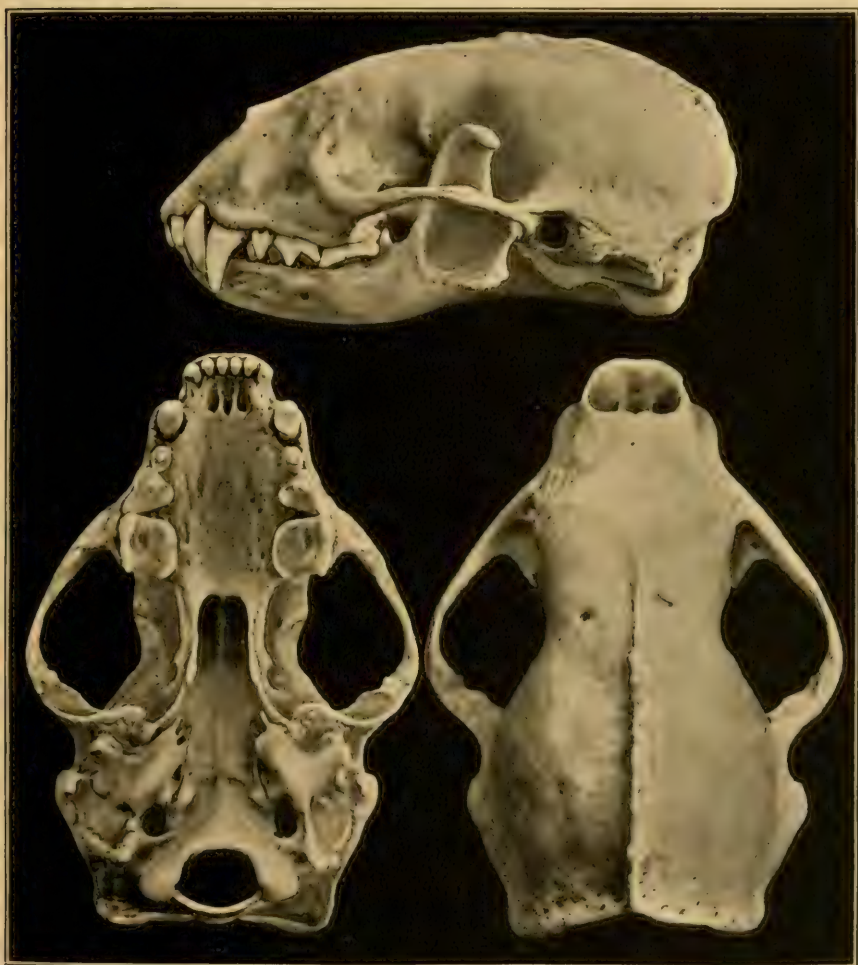


FIG. 96. CONEPATUS M. MEARNSI.

No. 5439 Field Columbian Mus. Coll. Nat. size

skull a gradual curve from occiput to end of premaxillæ; fore claws large and strong; soles naked for half the length of foot.

A. *Oryctogale*.

"Snout very long, overhanging the incisors a full inch (25 mm.), with a large naked pad on upper side for rooting in the ground; soles of hind feet entirely naked to heel; color black, with a single white median dorsal band, beginning on top of head between ears (or midway between eyes and ears) and reaching posteriorly to tail; tail white except at base underneath, which is black; skull relatively high; anterior nares large and obliquely truncate, broadly open as seen from above; ascending arm of premaxillæ reduced to a slender oblique splint; nasals and maxillæ ending posteriorly on essentially same plane; anterior part of nasals (in profile) essentially in fronto-nasal plane (not upturned or pugged); postorbital constriction slight; antorbital foramen single throughout." (Merr., l. c.)

KEY TO THE SPECIES AND SUBSPECIES.

A. Dorsal area white.

a. Size large, tail long.

a.' Black at base of tail beneath very re-	PAGE
stricted.....	
<i>C. sonoriensis</i>	514

b.' Black at base of tail beneath $\frac{1}{3}$ to $\frac{1}{2}$ of its total length.

a." White on back broad; rump never black.....	<i>C. leuconotus</i>	515
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b." White on back restricted; rump often black.....	<i>C. l. texensis</i>	515
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c.' Tail all white above and below.

a." Skull, occipito-nasal length, 678 mm.; length of upper premolar and molars, 16 mm.....	<i>C. mesoleucus</i>	515
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b." Skull, occipito-nasal length, 664 mm.; length of upper premolar and molars, 17 mm.....	<i>C. m. mearnsi</i>	516
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b. Size small, tail short.

a.' Hind foot, 74 mm.....	<i>C. felipensis</i>	517
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b.' Hind foot, 61 mm.....	<i>C. pediculus</i>	517
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B. Dorsal stripes two.....	<i>C. tropicalis</i>	517
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490. sonoriensis (*Conepatus*), Merr., Proc. Biol. Soc. Wash., xv, 1902, p. 162.

SONORAN SKUNK.

Type locality. Camoa, Rio Mayo, State of Sonora, Mexico.

Geogr. Distr. Valparaiso Mountains, State of Zacatecas, north-westerly into State of Sonora.

Genl. Char. Size large; tail long. Skull long and slender; upper molar and sectorial large.

Color. Black; white dorsal band broad throughout; tail white, black at base beneath restricted.

Measurements. Total length, 715; tail vertebræ, 300; hind foot, 84. Skull: basal length, 66.5; zygomatic breadth, 43; palatal length, 33; upper molar on outer edge, 8.5.

491. leuconotus (*Mephitis*). Licht., Darst. Neuer Oder Wenig Bekannter Säugeth., 1834, text, pl. XLIV, fig. 1.

WHITE-SPOTTED SKUNK.

Type locality. Upper waters of the Rio Alvarado, State of Vera Cruz, Mexico.

Genl. Char. Size large; white stripe from forehead in front of eyes.

Color. Black; white stripe from in front of eyes broadening in the middle, and extending to the end of tail, which is black on sides of basal half.

Measurements. Total length, 436; tail, 279.40; hind foot, 50.8; width of stripe at middle of back, 76.20.

a.—texensis (*Conepatus*), Merr., Proc. Biol. Soc. Wash., xv, 1902, p. 162.

TEXAN SKUNK.

Type locality. Brownsville, Lower Rio Grande, Cameron County, Texas.

Geogr. Distr. Coast of Texas from Rockport, Aransas County, to mouth of Rio Grande. State of Tamaulipas, Mexico?

Genl. Char. Similar to *C. leuconotus*, Licht., but larger; white dorsal area more restricted; rump often all black.

Color. Black; white dorsal stripe usually narrower on rump, sometimes not reaching it, leaving a white line between it and the tail, or the rump is all black; tail white, with one-third or one-half of the basal portion beneath black.

Measurements. Total length, 825; tail vertebræ, 365; hind foot, 86. Skull: basal length, 77; zygomatic breadth, 55.5; palatal length, 35; upper molar on its outer edge, 10.

492. mesoleucus (*Mephitis*), Licht., Darst. Neuer Oder Wenig Bekannter Säugeth., 1834, pl. XLIV, fig. 2.

WHITE-BACKED SKUNK.

Type locality. Chico, State of Vera Cruz, Mexico.

Genl. Char. Size large, white stripe from occiput, covering dorsal region and tail.

Color. Upper parts from occiput white; tail white; rest of body, legs, and feet black.

Measurements. Total length, 609.56; tail, 304.80; hind foot, 73.6.



FIG. LXXII. *CONEPATUS M. MEARNSI*. MEARN'S SKUNK.

a.—mearnsi (*Conepatus*), Merr., Proc. Biol. Soc. Wash., xv, 1902, p. 163.

mapurito, Elliot, Syn. N. Am. Mamm., Suppl., 1901, p. 510, pl. LVI.

MEARN'S SKUNK.

Type locality. Mason, Mason County, Texas.

Geogr. Distr. Table-land of Mexico from States of Jalisco and southwestern San Luis Potosi northward to central Texas and central Arizona.

Genl. Char. Similar to *C. mesoleucus*, but skull and teeth smaller.

Color. Entire upper parts from crown of head to end of tail white or yellowish; sides and legs shining black; under parts dull black except a narrow line between jaws and the throat, which are white; tail all white above and below; claws white.

Measurements. Total length, 670; tail vertebræ, 290; hind foot, 75. Skull: occipito-nasal length, 64; Hensel, 62.5; zygomatic width, 51; interorbital constriction, 20.5; palatal length, 29; postpalatal length, 34; length of mandible, 46.5; height at condyle, 10; length of upper molars, 7.5.

493. felipensis (*Conepatus*), Merr. Proc. Biol. Soc. Wash. xv, 1902, p. 163.

SAN FELIPE SKUNK.

Type locality. Cerro San Felipe, State of Oaxaca, Mexico.

Geogr. Distr. Cerro San Felipe, State of Oaxaca, Mexico; 9,000 to 10,500 feet altitude.

Genl. Char. Size small; dorsal stripe narrow. Skull depressed, flattened anteriorly; anterior nares small; upper molar and sectorial small.

Color. Black; similar in distribution of color to the other varieties, but the white dorsal stripe narrow and restricted in area.

Measurements. Total length, 630; tail vertebræ, 265; hind foot, 74. Skull: basal length, 64; zygomatic width, 47.5; palatal length, 31; length of upper molar, 7.5.

494. pediculus (*Conepatus*), Merr. Proc. Biol. Soc. Wash., xv, 1902, p. 164.

GUADALUPE SKUNK.

Type locality. Sierra Guadalupe, State of Coahuila, Mexico.

Genl. Char. Size small. Nasals broad, flat, square posteriorly; braincase elevated.

Color. No description given, but presumably like *C. felipensis*.

Measurements. Total length, 485; tail vertebræ, 178; hind foot, 61. Skull, basal length, 57; zygomatic breadth, 43; palatal length, 27; upper molar on its outer side, 7.

B. Marputius.

"Hind feet moderate, the bald soles extending to the heel; front claws elongate; tail rather short; nose acute, produced; fur bristly, close pressed; teeth like those of *Mephitis*." (Gray, l.c.)

495. tropicalis (*Conepatus*), Merr., Proc. Biol. Soc. Wash., xv, 1902, p. 164.

MOTZORONGO SKUNK.

Type locality. Motzorongo, State of Vera Cruz, Mexico.

Geogr. Distr. East coast of State of Vera Cruz, southeasterly to Yucatan.

Genl. Char. Two white dorsal stripes; tail short. Skull with a sinu-



FIG. 97. *CONEPATUS (MARPUTIUS) TROPICALIS*.
No. 10115 Mus. Comp. Zoöl. Nat. size.

ous profile; tips of nasals slightly upturned; frontals prominent, and a depression behind orbits.

Color. Black; two narrow white stripes from nape to hips; nuchal patch white, convex anteriorly; tail, basal portion black all around, reaching one-third the length above and one-half the length below.

Measurements. Total length, 575; tail vertebrae, 129; hind foot, 74. Skull: basal length, 67.5; zygomatic breadth, 50.5; palatal length, 32.5; length of last upper molar on its outer side, 8.

The little spotted skunks are, in appearance, the prettiest members of the tribe, their variously spotted and striped black and white coats making them very attractive. But their favorable qualities are all in their dress, for they are as odoriferous for their size as their larger brethren. These little animals have habits very similar to those of the large skunks, are omnivorous, and are often found in the vicinity of streams and lakes. They have been divided into rather numerous species, some of which are difficult to determine.

99. Spilogale. Striped or Spotted Skunks.

$$I. \frac{3-3}{3-3}, C. \frac{1-1}{1-1}, P. \frac{3-3}{3-3}, M. \frac{1-1}{2-2} = 34.$$

Spilogale Gray, Proc. Zool. Soc., 1865, p. 150. Type *Mephitis interrupta* Rafinesque.

"Head conical; nose short, underside with a distinct central groove; muzzle small, bald, rather notched in front; nostrils lateral; tail short, cylindrical, bushy, not so long as the body, ending in a long pencil of hair; hind feet moderate; sole bald, flat, the *front portion divided into four oblong pads*, the central one small and triangular, before the others, hinder part narrow; front claws elongate, brown; false grinders $\frac{2}{3}$; upper tubercular grinder square, moderate sized." (Gray, l.c.)

KEY TO THE SPECIES AND SUBSPECIES.

A. Skull narrow, arched.

- | | | |
|------|-------------------------------------|------------------------------|
| a. | Size small; not over 415 mm. | PAGE |
| a.' | Tail with tip only white..... | <i>S. pygmæa</i> 519 |
| b.' | Tail with apical third white. | |
| a." | Bands on thighs present. | <i>S. ambigua</i> 521 |
| b." | Bands on thighs absent. | |
| a''' | Size small; total length 345 mm. . | <i>S. angustifrons</i> 521 |
| b''' | Size large; total length, 378 mm. . | <i>S. a. tropicalis</i> 521 |
| c.' | Tail with apical half white..... | <i>S. a. martirensis</i> 521 |
| b. | Size large; over 415 mm | <i>S. interrupta</i> 523 |
| B. | Skull broad, flat | <i>S. lucasana</i> 523 |

496. pygmæa (*Spilogale*), Thomas, Proc. Zool. Soc., 1897, p. 898.

SINALOA SPOTTED SKUNK.

Type locality. Rosario, State of Sinaloa, Mexico.

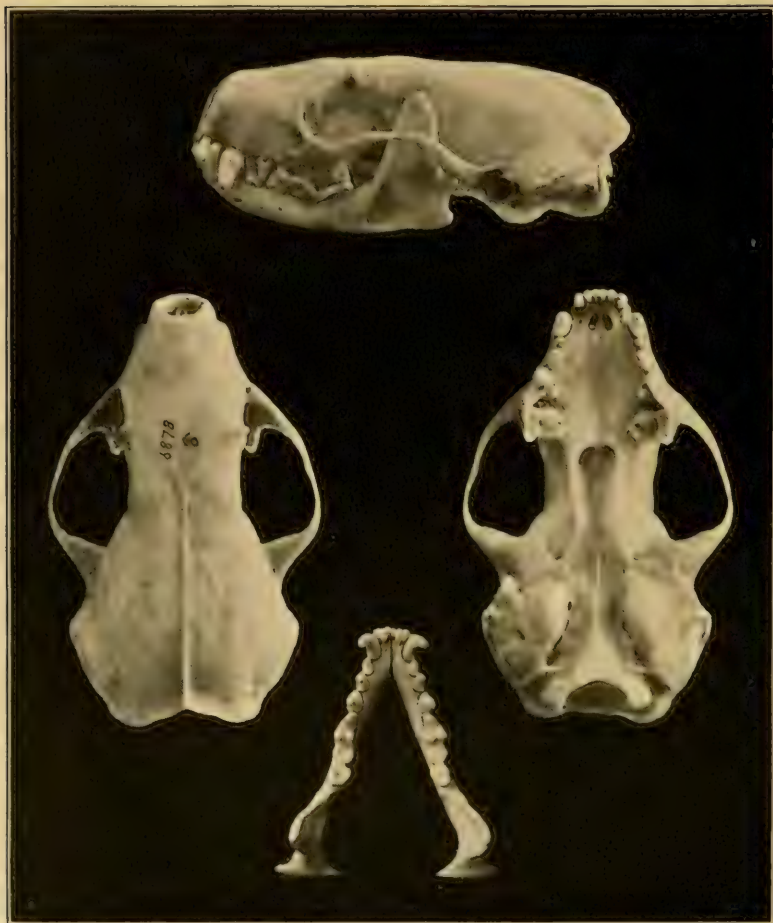


FIG. 98. *SPIOLOGALE INTERRUPTA*.
No. 6878 Field Columbian Mus. Coll. Nat. size.

Geogr. Distr. State of Sinaloa, Mexico.

Genl. Char. Size very small. Skull narrow, crown elevated; tail less than half the length of body.

Color. Black with white stripes and spots; white band across face from ear to ear; two median gray dorsal bands extending to rump, each divided by a narrow longitudinal black line; chin and two stripes from it to the ear patches white; lateral stripe and one running up onto the thighs white, as is also the upper surface of feet; inner side of legs black; tail at base above mixed black and white, tip white; beneath black at base; rest white.

Measurements. Total length, 250; tail vertebræ, 68; hind foot, 34; ear, 23. Skull: basal length, 38.2; Hensel, 36.6; occipito-nasal length, 41.5; mastoid breadth, 25.8; across postorbital processes, 14; palatal length, 15; length of first upper molar, 4.4.

497. *ambigua* (*Spilogale*), Mearns, Proc. U. S. Nat. Mus., xx, 1897, p. 460.

CHIHUAHUA LITTLE SPOTTED SKUNK.

Type locality. Eagle Mountain, State of Chihuahua, Mexico.

Geogr. Distr. State of Chihuahua, Mexico; Mimbres Valley and Lake Palomas, boundary line.

Genl. Char. Size small; ears short. Skull with fronto-parietal region elevated.

Color. Similar in pattern and color to *S. gracilis* of Arizona, except that there is more black on tail beneath at base, and the spots on thighs and base of tail above are smaller.

Measurements. Total length, 411; tail vertebræ, 147; hind foot, 43.

498. *angustifrons* (*Spilogale*), Howell, Proc. Biol. Soc. Wash., xv, 1902, p. 242.

NARROW-HEADED SPOTTED SKUNK.

Type locality. Tlalpam, Valley of Mexico, Mexico.

Geogr. Distr. Table-land in State of Guanajuato, to State of Chiapas, Mexico.

Genl. Char. Size small; usually white bands on thighs absent. Skull slender, no prominent ridges.

Color. Similar to *S. ambigua*; bands on thighs absent.

Measurements. Total length, average of three adult males, 345; tail vertebræ, 130; hind foot, 40. Skull: Hensel, 43; zygomatic breadth, 31.3; mastoid width, 27.5; interorbital width, 13.

a.—tropicalis (*Spilogale*), Howell, Proc. Biol. Soc. Wash., 1902, p. 242.

OAXACA SPOTTED SKUNK.

Type locality. San Mateo del Mar, State of Oaxaca, Mexico.

Genl. Char. Similar to *S. angustifrons*, but larger; skull with smaller teeth and larger mastoid capsules.

Color. Like *S. angustifrons*.

Measurements. "Average of three males; total length, 378; tail vertebræ, 144; hind foot, 44.7. Skull: Hensel, 47; zygomatic breadth, 33; mastoid breadth, 30.5; interorbital breadth, 14.5."

**arizonæ martirensis* (*Spilogale*), Elliot, Pub. Field Columb. Mus., III, 1903, p. 170. Zoölogy.

*For description of *S. arizonæ*, see Synopsis N. A. Mammals, p. 331.

SAN PEDRO MARTIR SPOTTED SKUNK.

Type locality. Vallecitos, San Pedro Martir Mountains, Lower California, Mexico; 9,000 feet elevation.

Genl. Char. Similar to *S. arizonæ* in markings, but the white stripes from occiput and cheek are narrower and shorter; broken stripe from fore leg across lower back broader; tail and hind foot shorter. Skull shorter and narrower with narrower rostrum, but braincase wider above auditory meatus.

Color. Entire body, legs, and feet jet black with white spots and stripes, as in *S. arizonæ*, differing only as mentioned above; tail jet black for basal half, white for the remainder; chin white; white spot on forehead large and broad.

Measurements. Total length, 395; tail vertebræ, 143; hind foot, 44; ear, 25. Skull: occipito-nasal length, 40; Hensel, 45.5; zygomatic width, 33; interorbital constriction, 12; width of rostrum, 11; length of nasals, 8; breadth of braincase over auditory meatus, 27; mastoid breadth, 30; palatal length, 19; postpalatal length, 26; length of mandible, angle to alveolus of incisor, 30; height at condyle, 6; at coronoid process, 15.



FIG. LXXIII. SPILOGALE INTERRUPTA. WHITE-SPOTTED SKUNK.
No. 6878 Field Columbian Mus. Coll.

- 499. interrupta** (*Mephitis*), Rafin., Ann. Nat., 1, 1820, p. 3. Elliot, Syn. N. Am. Mamm., 1901, p. 328.
quaterlinearis Winans, Coues, Fur-bear. Anim., 1877, p. 239.
bicolor. Gray, Mag. Nat. Hist., 1837, p. 583.

WHITE-SPOTTED SKUNK.

Type locality. Upper Missouri?

Geogr. Distr. From Guatemala throughout Mexico to Texas, Oklahoma Territory to Kansas.

Genl. Char. Tail large, black, slender white tuft at tip; white markings on body limited in extent; postorbital processes small.

Color. Black; small spot on forehead and crescent before ear; two stripes from nape, and one from each ear to middle of back; one broad lateral stripe from behind each fore leg joining a broad patch on side below the back stripes; two patches on middle of back; interrupted rather broad band across rump, and patch on rump each side of base of tail white; tail black, white tuft at tip, extending beyond the black hairs.

Measurements. Total length, 538; tail vertebræ, 215; hind foot, 47. Skull: basilar length, 58; Hensel, 51.5; occipito-nasal length, 52.7; zygomatic breadth, 34.8; mastoid breadth, 31.2; across postorbital processes, 16.7; interorbital constriction, 14.1; palatal length, 20; length of mandible, 37; height at coronoid process, 18.2; pterygoid fossa from tip of hamular process to palatal arch, 12.7.

- 500. lucasana** (*Spilogale*), Merr., N. Am. Faun., No. 4, 1890, p. 11.

CAPE ST. LUCAS SPOTTED SKUNK.

Type locality. Cape St. Lucas, Lower California, Mexico.

Geogr. Distr. Cape Region of Lower California, Mexico; range unknown.

Genl. Char. Size large; tail about as long as head and body.

Color. Black, with white spots and stripes; median pair of dorsal stripes, anterior transverse bands and lateral stripes joined together; lumbar spots elongated and confluent with posterior transverse stripe, forming an angle posteriorly; tail spots indistinct; two stripes from chin to throat, and three connected by a curved line; two lines from angles of mouth to below the ears, and there joining the lateral stripes; tail with white spots and white tip.

Measurements. Skull: basilar length, 64; Hensel, 55.5; occipito-nasal length, 59; zygomatic breadth, 40.5; mastoid breadth, 38.5; across postorbital processes, 20; interorbital constriction, 18; palatal length, 22.5; width of braincase, 24.5; length of mandible, 41.5; height at coronoid process, 20.5; tip of hamular process to palatal arch (pterygoid fossa), 12.6.

The Grisons, as the animals of the genus GRISON are called, are plantigrade, with a weasel-like body, short legs, and a long tail. They live in the hollows of trees, or cavities in rocks, or holes in the earth; in fact, in any kind of place that will afford them a refuge and shelter, and often keep in the neighborhood of houses or farm buildings. In general appearance they are not unlike the Marten.

100. Griston. The Grisons.

$$I. \frac{3-3}{3-3}; C. \frac{1-1}{1-1}; P. \frac{3-3}{3-3}; M. \frac{1-1}{2-2} = 34.$$

Griston Oken, Lehrb. der Zoöl., II, 1816, p. 1000. Type *Viverra vittata* Schreber.

Tayra Oken, Lehrb. der Zoöl., II, 1816, p. 1001.

Laira F. Cuv., Hist. Nat. Mamm., v, 1826, livr. XLV.

Galictis Bell Zoöl. Journ., II, 1826, p. 551.

Galidictis I. Geoff., Mag. Zoöl., Mamm., 1839, p. 32.

Galera Browne, Civil & Nat. Hist. Jamaica, 2d ed., 1789, p. 485,

Tab. 49, fig. 1. Gray, List. Spec. Mamm. Brit. Mus., 1843, p. 67.

Gristonia Gray, Ann. Phil., XXVI, 1825, p. 339. *Id.* Proc. Zoöl.

Soc., 1865, p. 122.

Nose short, grooved; body long, limbs short; claws short, curved, acute, non-retractile; soles naked; head broad; tail moderately long, covered with long hairs; thumb with long claw. Inner tubercle of upper carnassial near the middle of the inner border; talon and inner cusp of lower carnassial small, sometimes absent.

KEY TO THE SPECIES AND SUBSPECIES.

	PAGE
A. Head and neck brown..... <i>G. b. biologiæ</i>	524
B. Head and neck grayish white..... <i>G. b. senex</i>	525
C. Face black; whites stripe from forehead to sides of neck.	
a. Base of long hairs on back black..... <i>G. allamandi</i>	526
b. Base of long hairs on back gray..... <i>G. canaster</i>	526

A. *Tayra*.

barbara biologiæ (*Galictis*), Thomas, Ann. Mag. Nat. Hist., 7th Ser., v, 1900, p. 146.

CALOVEVORA GRISON. *Chulomuco*, *Tulomuco* in Costa Rica.

Type locality. Calovevora, Veragua, Panama.

Geogr. Distr. Central America generally.

Genl. Char. Similar to *G. barbara*, but head darker.



FIG. 99. GRISON (TAYRA) BARBARA.
No. 5516 Coll. Am. Mus. Nat. Hist. $\frac{2}{3}$ nat. size.

Color. Like *G. barbara* in general hue, but head and neck brown, similar to the color of upper parts, into which the hue of the head gradually passes.

Measurements. Skull: total length, 98; width, 63; no other measurements given.

barbara senex (*Galictis*), Thomas, Ann. Mag. Nat. Hist., 7th Ser., v, 1900, p. 140.

barbara True, Proc. U. S. Nat. Mus., 1884, p. 609. (Part.)
GRAY-HEADED GRISON. *Cabeza de Viejo* in State of Vera Cruz.

Type locality. Hacienda Tortugas, Jalapa, State of Vera Cruz, Mexico. Altitude, 600 feet.

Geogr. Distr. State of Vera Cruz, southeastern Mexico? Known only from type locality.

Genl. Char. Size rather large.

Color. Head and neck grayish white; remainder of body black; white spot on breast; tail colored like body.

Measurements. Skull: basal length, 109; greatest breadth, 76.

B. *Galictis*.

501. *allamandi* (*Galictis*), Bell, Proc. Zool. Soc., 1837, p. 47. *Id.*

Trans. Zool. Soc., 11, 1837, p. 204, pl. xxxvii.

ALLAMAND'S GRISON.

Type locality. Unknown.

Color. "The base of the hairs on the back therefore is black, and the tips quite white, forming a pure blackish gray or black with white points and lines; whilst all the under parts of the throat and front of the belly are black. The fascia extending from the forehead back to the sides of the neck is also white. This fascia does not extend in the specimen described as in the former species. (*G. vittata*.) The hairs of the whole body are very short in comparison and much stiffer and more closely set. The animal is considerably larger (than *G. vittata*), and the tail for a stuffed specimen shorter in proportion." (Bell, l. c.)

Measurements. None given.

502. *canaster* (*Galictis*), Nelson, Proc. Biol. Soc. Wash., xiv, 1901, p. 129.

NELSON'S GRISON.

Type locality. Tunkas, State of Yucatan, Mexico.

Geogr. Distr. From Orizaba, State of Puebla, to State of Yucatan.

Genl. Char. Body long, weasel-like; legs short; head broad; ears short, rounded; tail short.

Color. Face, feet, legs, and entire under parts black; pure white stripe across forehead extending over eyes and across cheeks and ears nearly to shoulders; rest of head grading from pure white into the smoky gray that covers entire upper parts; long hairs of upper parts have a broad subterminal black band and white tip; tail probably like the back, but in the present specimen the dark hairs seem to have been worn away or shed, for only about an inch of their base is like the back, remaining portion being a uniform dark gray.

Measurements. Total length, 720; tail to end of hairs, 170; hind foot, 50 (dried skin). Skull: occipital region lacking; greatest



FIG. 100. GRISON (*GALICTIS*) CANASTER.
No. 6420 Coll. Mus. Comp. Zool. Nat. size.

zygomatic width, 50; palatal length, 37; across postorbital processes, 26; median nasal length, 11.5; length of upper sectorial, alveolus



FIG. LXXIV. GRISON (*GALICTIS*) *CANASTER*. NELSON'S GRISON.
No. 6420 Mus. Comp. Zool. Coll.

outer side, 9; length of mandible, 47; height at condyle, 10; at coronoid process, 23; length of lower tooth row, 23. (Specimen from Orizaba, Mexico, Coll. Mus. Comp. Zool. Cambridge, Mass.)

The genus *PUTORIUS* is a large one, and contains the true Weasels, Ferrets, and Mink, and is divided into several sections having subgeneric values. The largest number of species are included in the true Weasels here placed under the subgeneric term, *Arctogale*, the members of which living in boreal regions turn white in winter. Great difference is observable in size between males and females, the latter being very much smaller. The Arctic weasel is valued for its fur, which is the well-known ermine of commerce. The weasel is remarkable for its long, sinuous body and neck, flat serpentlike head, short legs, and a moderately long tail. It is wonderfully quick in its movements, and in the pursuit of its quarry is able to enter any hole or penetrate any underground gallery in which its prey may have sought refuge, the lithe, flexible body accommodating itself to all the twists and turns met with. Possessed of good sight, it follows a fleeing animal at full speed, but when its prey is lost to view it then tracks it by its keen scent, exhibiting all the tactics of the well-trained hound, doubling on its course and following every movement of the creature hunted, and when the track is momentarily lost, making wide circles in order to strike it again. In the chase of any animal the weasel is indefatigable, and few escape its relentless pur-

suit. Weasels are fierce and bloodthirsty and destroy many more animals than they can possibly devour, merely to gratify their passion for killing. Rats and mice speedily disappear from a locality in which a weasel has taken up its abode, and in performing this service it confers a benefit on the farmer, and so makes some amends for the destruction it may commit among the poultry. This active creature seems ever in motion, and its course is marked by blood and rapine, as it investigates every hole and burrow, penetrating to the very extremity of the galleries and slaying all creatures it may meet that may not be too powerful for it to grapple with successfully; and while on these forays an abundance of food does not restrain it or cause it to remain near a well-stocked larder, but its bloodthirsty proclivities impel it onward in search of more opportunities to kill. If the great cats were endowed in proportion to their size with an agility and physical power equal to that of this little murderer, it would be a doubtful question if even man could successfully cope with them in a struggle for the mastery. The weasel is not abundant in any locality, and it is a solitary animal, but a family usually passes the first summer together. It is mostly a nocturnal animal, rarely seen by day, and lives in crevices of the rocks, in hollow stumps or trees, and also in burrows underground, selecting those of rodents it has either destroyed or driven away. The average litter is about six, but at times this number is greatly exceeded. Anal glands are present in weasels which contain a fluid that can be ejected in a fine spray, and which is very offensive, only slightly less so than that of the skunk.

101. Putorius. Weasels.

$$I. \frac{3-3}{3-3}; C. \frac{1-1}{1-1}; P. \frac{3-3}{3-3}; M. \frac{1-1}{2-2} = 34.$$

O. Bangs. *A Review of the Weasels of eastern North America*, Proc. Biol. Soc. Wash., 1896, pp. 11-24.

C. H. Merriam. *Synopsis of the Weasels of North America*, N. Am. Faun., No. 11, 1896, pp. 5-36.

Putorius Frisch, Nat. Syst. vierfüß. Thiere, in Tab. 11, Tab. Gen., 1775. Cuv., Règn. Anim., 1, 1817, p. 147. Gray, List Spec. Mamm., Brit. Mus., 1843, p. 64. Type *Mustela putorius* Linnaeus.

Arctogale Kaup, (nec Peters), Entw.-Gesch. Nat. Syst. der Europ. Thierw., 1, 1829, p. 30.

Ictis Kaup, Entw.-Gesch. Nat. Syst. der Europ. Thierw., 1, 1829, p. 40.

Gale Wagn., Suppl. Schreb. Säugeth., Suppl., II, 1841, p. 234.

Luticola Wagn. Schreb. Säugeth. Suppl., II, 1841, p. 239.

Vison Gray, List Spec. Mamm. Brit. Mus., 1843, p. 64.

Neogale Gray, Proc. Zool. Soc., 1865, p. 114.

Cynomyonax (*sic*) Coues, Fur-bear. Anim., 1877, p. 147.

Size medium to smallest carnivorous mammal (*P. rixosus*); body very slender; legs short; tail long, bushy, or close-haired terminating in a pencil; ears large; soles haired; lower sectorial without inner cusp; antorbital foramen small; opening over last premolar; rostrum short, vertically truncate; nasals widening from their base anteriorly; bullae flat; zygomatic arch not usually elevated posteriorly.



FIG. 101. PUTORIUS FRENATUS.

No. 5462 Field Columbian Mus. Coll. Nat. size.

A. Arctogale.

Body slender, attenuate; neck long; ears large; tail slender, terete; limbs short; toes separate. Skull: frontal profile arched; moderate interorbital constriction; postorbital processes slightly developed; pterygoids with or without hamular processes.

KEY TO SPECIES AND SUBSPECIES IN SUMMER PELAGE.

- A. Tail more than half as long as head and body;
white streak between eyes.
- a. White spot on forehead.
- a.' Sagittal crest absent; interorbital constriction slight; audital bullæ small and narrow. PAGE
- a." Small. *P. tropicalis* 531
- b." Large. *P. t. perdus* 531
- b.' Sagittal crest present; interorbital constriction considerable.
- a." Audital bullæ obliquely truncate anteriorly.
- a."" Under parts orange. *P. frenatus* 532
- b."" Under parts pale yellowish
ochre. *P. f. neomexicanus* 533
- b." Audital bullæ narrow; under parts salmon. *P. f. goldmani* 533
- c." Audital bullæ small, high on inner side;
under parts orange buff. *P. f. leucoparia* 534
- b. No white spot on forehead. *P. affinis* 534

503. tropicalis (*Putorius*), Merr., N. Amer. Faun., No. 11, 1896, p. 30.
TROPICAL WEASEL.

Type locality. Jisco, State of Vera Cruz, Mexico. Altitude, 6,000 feet.

Geogr. Distr. State of Vera Cruz, Mexico, and along coast into Guatemala.

Genl. Char. Smaller and darker than *P. frenatus*; white markings less and color paler on belly.

Color. Upper parts deep umber brown with a fulvous tinge; head, ears, and neck black; white band between eyes and ears, and patch between eyes; throat and fore feet ochraceous buff; belly and inner sides of thighs orange buff; inner side of hind feet and toes buffy; forehead and wrists yellow; tail with apical fourth black.

Measurements. Total length, 442; tail vertebræ, 175; hind foot, 50. Skull: basal length, 37.5; Hensel, 36.5; zygomatic width, 22.5; across postorbital processes, 12; interorbital width, 9; palatal length, 16; postpalatal length, 21.5.

a.—perdus (*Putorius*), Merr., Proc. Biol. Soc. Wash., xv, 1902, p. 67.

TEAPA WEASEL.

Type locality. Teapa, State of Tabasco, Mexico.

Geogr. Distr. Known only from type locality.

Genl. Char. Similar to *P. tropicalis*, but larger.

Color. Upper parts dark, as in *P. affinis*, and completely covering hind feet and lower legs, and upper and outer sides of fore legs and feet except a small irregular yellowish blotch on top of fore foot; under parts orange fulvous, deeper and concentrated on belly and thighs, leaving *throat and sides of neck white* in contrast; facial white markings complete, the side stripe reaching above base of eye, the patch between eyes large and broad (not restricted as in *tropicalis*); black cheek patches much larger and broader; no black spot under ear. (Merr., l. c.)

Measurements. None given.



FIG. LXXV. PUTORIUS FRENATUS. BRIDLED WEASEL.
No. 5462 Field Columbian Mus. Coll.

504. frenatus (*Mustela*), Licht., Darst. Säugeth., 1832, pl. XLII.

Elliot, Syn. N. Am. Mamm., 1901, p. 350.

BRIDLED WEASEL. *Onza*, also for the Jaguar, in Mexico; *Comadreja* commonly in Spanish America.

Type locality. Valley of Mexico, near City of Mexico, Mexico.

Geogr. Distr. State of Mexico, north into Texas.

Genl. Char. Size large; tail long. Skull large and massive; bullæ obliquely truncate anteriorly; postorbital constriction marked.

Color. Band between eye and ear, and patch between eyes white; top of head from dark chestnut brown to black; rest of upper parts rich brown; chin and throat whitish; rest of under parts varying from

ochraceous yellow to orange; inner sides of hind legs and hind feet, and the toes yellow or orange; the color of the feet is almost always the same as that of the under parts; tail same color as back all around, with a short black tip.

Measurements. Total length, male, 455-505; tail vertebræ, 170-203; hind foot, 45-53. Skull: basal length, 52.5; Hensel, 51; zygomatic breadth, 33.5; mastoid width, 23.5; across postorbital processes, 13.5; interorbital width, 9.5; palatal length, 20.5; postpalatal length, 23.2.

a.—neomexicanus (*Putorius*), Barb. & Cockrell, Proc. Acad. Nat. Scien. Phil., 1898, p. 188. Elliot, Syn. N. Am. Mamm., 1901, p. 351.

RIO GRANDE BRIDLED WEASEL.

Type locality. Shore of Armstrong Lake, Mesilla Valley, near the Rio Grande, Donna Ana County, New Mexico.

Geogr. Distr. Probably northeastern Mexico to 200 miles north in the Rio Grande Valley, New Mexico.

Genl. Char. Similar to *P. frenatus*, but paler; white markings on the head more extensive; occipital condyles more produced behind.

Color. Head brownish black, a quadrangular patch between the eyes, joining broad bands between eyes and ears, creamy white, the bands grading into the color of the under parts; face speckled with whitish; small whitish mark behind ears; upper parts and limbs pale yellowish ochre; under parts similar but lighter; tail tinged with reddish; tip black; feet pallid.

Measurements. Total length, 500; tail, 205; hind foot, 50. Skull: total length, 54; greatest breadth, 32; interorbital breadth, 14.5; foramen magnum to plane of last molar, 34.

b.—goldmani (*Putorius*), Merr., N. Am. Faun., No. 11, 1896, p. 28. GOLDMAN'S BRIDLED WEASEL.

Type locality. Pinabete, State of Chiapas, Mexico. Altitude, 8,200 feet.

Geogr. Distr. State of Chiapas, Mexico; range unknown.

Genl. Char. Similar to *P. frenatus*; tail and hind feet longer; upper parts darker; black on head and tail more extensive.

Color. Upper parts with fore and hind feet dark chestnut brown, washed with black from shoulders anteriorly grading into pure black on head; patch between eyes and narrow band between eye and ear white; black spot at angle of mouth; under parts salmon ochraceous, extending to wrists posteriorly; apical third of tail black.

Measurements. Total length, 504; tail vertebræ, 201; hind foot, 58.

c.—leucoparia (*Putorius*), Merr., N. Am. Faun., No. II, 1896, p. 29.
MICHOCAN BRIDLED WEASEL.

Type locality. Patzcuaro, State of Michoacan, Mexico.

Geogr. Distr. State of Michoacan, Mexico; range unknown.

Genl. Char. Larger than *P. frenatus*, similar in color, black and white markings on head and face more extended.

Color. Upper parts dark brown; top and sides of head black; broad band of white between eyes and ears, and white spot between eyes; upper lip bordered with whitish; chin and throat buffy yellow; rest of under parts, fore feet, inner sides of hind legs and feet, and terminal half of hind feet buffy ochraceous; tail dark brown; tip black.

Measurements. Total length, 510; tail vertebræ, 201; hind foot, 53.

505. *affinis* (*Mustela*), Gray, Ann. Mag. Nat. Hist., 4th Ser., XIV, 1874, p. 375.

ALLIED WEASEL. *Collaraja* in Costa Rica.

Type locality. Colombia.

Geogr. Distr. Costa Rica, south into South America.

Genl. Char. Size large, white streak on side of head in some examples. Frontal region of skull broad, and audital bullæ flat.

Color. Head blackish brown, almost clear black, rest of upper parts and tail very rich dark chestnut brown; tip of tail black; chin and throat yellowish white; rest of under parts and inner side of fore legs ochraceous orange; in some specimens a white streak in front of ear; in others there is no facial mark.

Measurements. Total length, 510; tail, 180; hind foot, 52 (skin).

Otters are mainly aquatic in their habits, and their food is fish, which they capture by swimming. In the water the Otter moves with ease, its action even graceful, and it dives instantaneously either to escape danger or to pursue its finny prey. The nest or sleeping place of this animal is formed of grass, and is usually placed among the roots of a tree, or in a hole in the bank of a stream, or in the hollow of a tree near water. As a digger the Otter is not famous, and its retreats are usually those formed by nature, or by some burrowing animal. Otters are playful creatures, and their chief amusement is sliding. The highest place in the bank, or if in winter the topmost ridge of snow is selected, and lying on its stomach with the front legs laid backward, giving itself a push with the hind feet, it glides head-first down the declivity, and this is repeated many times,



LUTRA ANNECTANS.

No. 46 Am. Mus. Nat. Hist. Coll. $\frac{2}{3}$ nat. size.

the animal after each descent scrambling awkwardly to the top for another plunge downward. Otters are eagerly sought by trappers, on account of their beautiful fur, which is very thick and of a rich color, and possesses good wearing qualities. It has been pursued, like all other fur-bearing animals, with such persistency and success, that in most localities it has become very scarce, and in others has disappeared entirely. North of Mexico a number of species and races are recognized at the present time, and how many exist south of the Mexican boundary is not definitely known.

Subfam. **Lutrinæ.**

Body lengthened, supple; tail long, tapering, depressed, sides rounded; feet short, broad, palmate; digits distinct, center one the longest; claws small; head broad, muzzle short; soles and palms hairy; eyes and ears small.

102. **Lutra. Otters.**

$$I. \frac{3-3}{3-3}; C. \frac{1-1}{1-1}; P. \frac{4-4}{3-3}; M. \frac{1-1}{2-2} = 36.$$

Lutra Briss. Règn. Anim., 11 ed., 1762, p. 201. Type *Mustela lutra* Linnaeus.

Lataxina Gray, List Spec. Mamm. Brit. Mus., 1843, pp. xxi, 70.

Lataxia Gerv., Hist. Nat. Mamm., 11, 1855, p. 118.

Upper molar large, quadrate; posterior upper premolar triangular. Skull depressed, superior outline nearly straight; rostrum short; hind portion of skull dilated; nostrils large; palate extending beyond molars; hamular processes to pterygoids.

KEY TO THE SPECIES AND SUBSPECIES.

- | | |
|--|---------------------------------|
| A. Superior outline of skull straight; bullæ flattened; upper molar quadrate; no diastema between 1st and 2d premolars..... | PAGE
<i>L. c. sonora</i> 535 |
| B. Superior outline of skull sloping anteriorly; bullæ less flattened; upper first molar extended transversely; diastema present between 1st and 2d lower premolars..... | <i>L. annectens</i> 536 |

canadensis sonora (*Lutra*), Rhoads, Proc. Am. Phil. Soc., N. S., 1898, p. 431. Elliot, Syn. N. Am. Mamm., 1901, p. 353.

MEXICAN OTTER.

Type locality. Montezuma Well, Beaver Creek, Yavapai County, Arizona.

Geogr. Distr. State of Sonora, Mexico, to Wyoming.



FIG. LXXVI. LUTRA C. SONORA. MEXICAN OTTER.

Genl. Char. Size large; hind foot long. Postorbital processes of skull slender, attenuate; no diastema between 1st and 2d premolars.

Color. Above dark brown, changing to pale grayish brown below, being whitish on under sides of head and neck; the hairs on head and neck above tipped with yellowish brown.

Measurements. Total length, 1300; tail vertebræ, 472; ear, 15. Skull: occipito-nasal length, 88.6; greatest zygomatic width, 73.2; basal length of Hensel, 96; palatal length, 48.

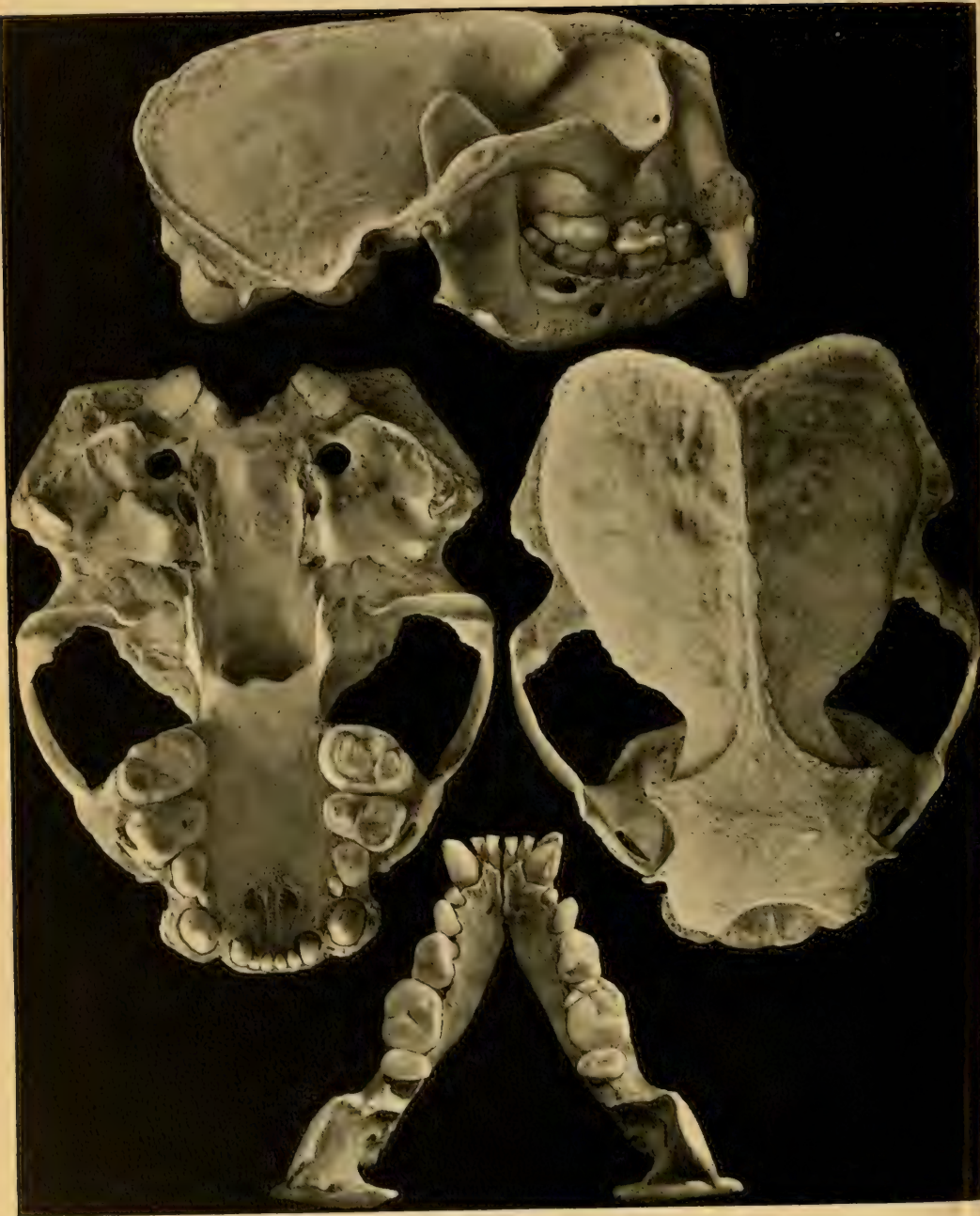
506. annectens (*Lutra*), Forsyth-Major, Zoöl. Anzieger, xx, 1897, p. 142. *Id.* Ann. Mag. Nat. Hist., 6th Ser., XIX, 1897, p. 618. CENTRAL AMERICAN OTTER. *Nutria* in Costa Rica.

Type locality. Rio de Tepic, Territorio de Tepic, Mexico.

Genl. Char. Premolars small, slender; diastema between first and second lower premolars; superior outline inclining downward anteriorly, not straight; bullæ less flat than those of *L. canadensis*; inferior mandibular margin straight.

Color. Not given.

Measurements. Skull: basal length, 97.8; greatest breadth, 75.1; palatal length, 45.9-46.5.



LATAX LUTRIS.

No. 371 Field Columbian Mus. Coll. $\frac{2}{3}$ nat. size.

103. Latax.

$$I. \frac{3-3}{2-2}; C. \frac{1-1}{1-1}; P. \frac{3-3}{3-3}; M. \frac{1-1}{2-2} = 32.$$

Latax Gloger, Nov. Act. Phys. Med. Acad. Caes. Leop. Carol., XIII, 1827, pt. 2, p. 511. Type *Lutra marina* Erxl. = *Mustela lutris* Linnæus.

Pusa Oken, Lehrb. Naturg., 1816, Th. III, 2te Abth., p. 986. (nec Scopoli.)

Enhydra Flem. Phil. Zoöl., II, 1822, p. 187. (nec *Enhydria* Merrem. Rept.)

Only four incisors in lower jaw; molars massive, cusps rounded, smooth; upper molar and posterior upper premolar somewhat oval; anterior lower premolar largest of the lower teeth; skull similar to that of *Lutra*; hind feet larger, flat, fin-like; fifth toe longest, rest diminishing to the first; claws moderate; tail obtuse, one-fourth the length of head and body.

507. lutris (*Mustela*), Linn., Syst. Nat. I, 1758, p. 45; I, 1766, p. 66. Elliot, Syn. N. Am. Mamm., 1901, p. 354.

marina Erxleb., Syst. Regn. Anim., 1777, p. 445.

orientalis Oken, Lehrb. Natur., III, 1816, p. 986.

stelleri Less., Man. Mamm., 1827, p. 156.

gracilis Fisch., Syn. Mamm., 1829, p. 229.

SEA OTTER.

Type locality. "America Septentrionali."

Geogr. Distr. Coasts of Bering Sea and of the North Pacific Ocean, south to coasts of northern Lower California in the Kelp beds of San Tomas and San Quentin bays. Nearly extinct on American and Mexican shores.

Genl. Char. Hind feet very broad, webbed soles furry; fore feet very small, palms naked; tail flattish, smooth, one-fourth length of body; only four lower incisors.

Color. Adult: black, frosted with white-tipped hairs; head and neck grayish white or yellowish white.

Measurements. Total length about 1050; tail vertebræ, 330; hind foot, 150; width, 100. Skull: occipito-nasal length, 111; Hensel, 109; zygomatic width, 98; width across postorbital processes, 48; inter-orbital constriction, 28; mastoid breadth, 96; length of nasals, ankylosed, about 20; palatal length, 56; length of braincase, 62; length of first upper molar, 7; width, 11; length of first lower molar, 15; width 13; length of mandible, angle to alveoli of incisors, 75; height, angle to condyle, 21; angle to top of coronoid processes, 44.

Order VIII. **Pinnipedia. Sea-lions, Seals, etc.**

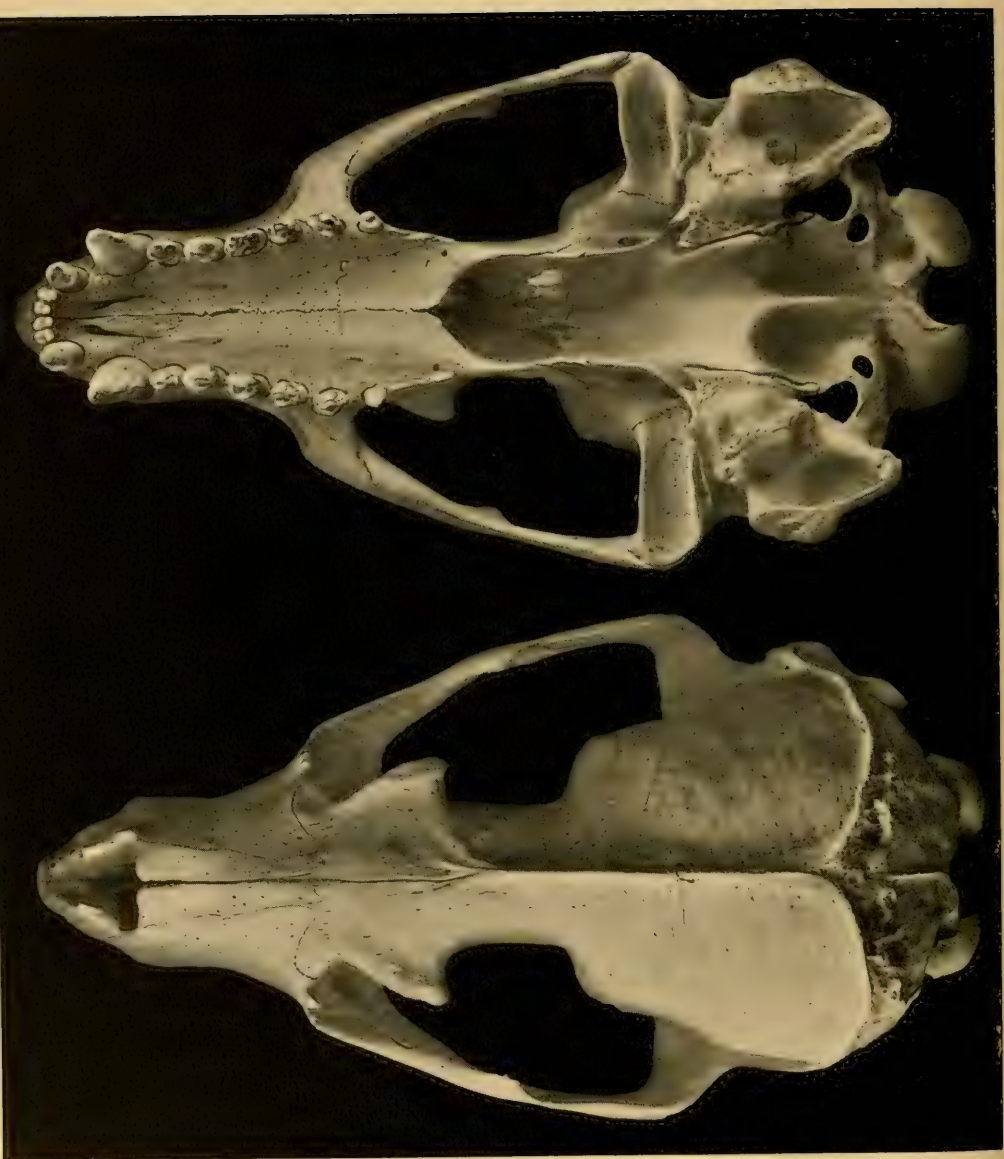
J. A. Allen, *History of North American Pinnipeds*, U. S. Geol. & Geog. Surv., 1880.

St. G. Mivart, *Notes on the Pinnipedia*, Proc. Zoöl. Soc., 1885.

The members of the PINNIPEDIA are constructed for a life in the water, although some species, like the Sea-bears and Sea-lions, are capable in emergencies of progressing on the land with considerable rapidity, but the majority are practically helpless when out of the water, and they progress on shore by a series of hitches affected by the action of the ventral muscles. Their feet are webbed, and the greater portion of their limbs is hidden within the skin. The body tapers towards both ends like that of a fish, and is covered with a thick coating of fat as a protection against cold, for most species of this Order are boreal in their habitats. The food of these animals is fish and other marine creatures, which they catch by swimming, or as in the case of crustaceans, are taken from rocks, or the bottom of the sea. While their lives are for the most part passed in the sea, they always come to the land to bring forth their young. Widely distributed, they are found in most of the seas of the Globe, and yet are not very numerous in species. Gregarious by nature, they often go in large herds, and certain of them, like the Fur Seal, are preyed upon by Cetaceans, such as the various species of Orcas or Killer Whales, etc. Of their skins, that of the Fur Seal is most valuable, but the species is rapidly verging towards extinction. Certain of these aquatic animals are of enormous size, some, like the Walrus, weighing nearly a ton.

Fam. I. **Otariidae. Sea-lions.**

Aquatic carnivora, with the limbs inclosed in the general tegument beyond the knees and elbows. Five digits on each limb, the first and fifth of the hind limbs generally the longest and stoutest, those of the front limbs decreasing in size from first to fifth. Body and neck elongate; fore feet nearly as large as the hind feet, the latter capable of expansion, and with distinct claws on the three middle digits; front feet without claws; tail very short; when walking hind feet are turned forward under the body, supporting it; ears external; interorbital constriction of skull great; facial portion short, rather broad; two central pairs of upper incisors with a transverse



ZALOPHUS CALIFORNIANUS.

groove; postorbital processes developed; alisphenoid canal present; testes external in a scrotum.

The Sea-lions are among the largest of aquatic animals, a full-grown male being over thirteen feet in length, and with an average weight of one thousand pounds. They are generally found in large herds, sunning themselves, or sleeping on the rocks near the sea, into which they plunge when alarmed. The sound of their deep growling, or loud roars, is constantly vibrating among the rocky islands to which they are accustomed to resort, and betrays their presence to any one in the vicinity. Sea-lions are not courageous as a rule in the presence of man, and make the most violent efforts to escape if on land, but once in the water their curiosity overpowers to a great degree their fears, and they swim about, lifting themselves half out of water at times, in order to obtain a good look at the unwelcome intruder. They are valuable animals to the natives, who make waterproof clothing and various other articles from the skins, sinews, and intestines.

104. *Zalophus*. Sea-lion.

$$I. \frac{3-3}{2-2}; C. \frac{1-1}{1-1}; P. \frac{4-4}{4-4}; M. \frac{1-1}{1-1} = 34.$$

Zalophus Gill, Proc. Essex Instit., 1866, v, p. 7. Type *Otaria gillespii* McBain = *Otaria californiana* Lesson.

Neophoca Gray, Ann. Mag. Nat. Hist., 3d Ser., xviii, 1866, p. 231.

Head rounded; nose narrow, pointed; eyes large; ears rather long, narrow, pointed; skin of feet extending beyond the nails, the margin lobed. Canines large, curved, acute; palate ends beyond the pterygoid processes, and is nearly flat, emarginate behind; posterior border of nasals extending beyond zygoma; pterygoid processes hook-like; upper molar separated by a wide space from premolars. No space between molars.

508. californianus (*Otaria*), Less., Dict. Class. Hist. Nat., xiii, 1828, p. 420. Elliot, Syn. N. Am. Mamm., 1901, p. 356.

gillespii M'Bain, Proc. Edinb. Roy Soc., i, 1858, p. 422.

CALIFORNIA SEA-LION.

Type locality. California.

Geogr. Distr. From Coronados Islands and Tres Marias Islands, and coast of Lower California, Mexico, along Pacific coast, to Bay of San Francisco, California.

Genl. Char. Skull: facial portion elongate, slender; zygomatic breadth less than half the length of skull; postorbital processes long, narrow, and directed backward in old animals; molars usually closely approximate, sagittal and occipital crests highly developed.



FIG. LXXVII. *ZALOPHUS CALIFORNIANUS*. CALIFORNIA SEA-LION.

Color. This varies greatly among individuals and at different seasons, from yellow and brownish yellow, to reddish, and blackish brown; limbs blackish brown, as also the belly. After the coat is shed, the pelage is golden brown; whiskers yellowish white.

Measurements. Total length, male, 2160; to outstretched hind flippers, 2542; fore foot, 360; hind foot, 380; tail, 110; ear, 35; longest whisker, 225. Female much smaller.



PHOCA GEROMINENSIS.



Fam. II. **Phocidæ. Seals.**

Neck short; hind limbs useless for terrestrial progression; palms and soles of feet hairy; no external ear; testes abdominal, no scrotum; skull without postorbital processes, and no alisphenoid canal; auditory bullæ inflated; five developed claws on each foot, those of hind feet subequal, the first and fifth not greatly exceeding the others in length, and not extending beyond the toes.

105. Phoca.

$$I. \frac{3-3}{2-2}; C. \frac{1-1}{1-1}; P. \frac{4-4}{4-4}; M. \frac{1-1}{1-1} = 34.$$

Phoca Linn., Syst. Nat., i, 1758, p. 37; i, 1766, p. 55. Type *Phoca vitulina* Linnaeus.

Pusa Scop., Intr. Hist. Nat., 1777, p. 490. (nec Oken.)

Calocephalus F. Cuv., Dict. Scien. Nat., xxxix, 1826, p. 544.

Stenmatopus F. Cuv., Dict. Scien. Nat., xxxix, 1826, p. 550.

Pagophilus Gray, Erebus & Terror, Zool. 1844, p. 3.

Pagomys Gray, Proc. Zool. Soc., 1864, p. 31.

Erignathus Gill, Proc. Essex Inst., 1866, p. 5.

Haliphilus Gray, Ann. Mag. Nat. Hist., 3d Ser., xvii, 1866, p. 446.

Incisors simple, conical; molars, excepting the anterior one, two-rooted, and generally tri-lobed, and with accessory cusps; all feet with five strong, compressed slightly curved claws; first and second digits on fore feet subequal; facial portion of skull narrow, lengthened; interorbital constriction considerable.



FIG. LXXVIII. PHOCA RICHARDI. PACIFIC OCEAN SEAL.

richardi geronimensis Allen, Bull. Am. Mus. Nat. Hist., 1902, p. 495.
SAN GERONIMO HAIR SEAL.

Type locality. San Geronimo Island, Lower California, Mexico, to Santa Barbara Island, California.

Geogr. Distr. Southern portion of the North Pacific Ocean; range unknown.

Genl. Char. Like *P. richardi*, but larger and with heavier dentition.

Color. Like *P. richardi*.

Measurements. Skull: basal length, 225; zygomatic breadth, 134; mastoid breadth, 131; palatal length, 95; width between molars, 46; interorbital constriction, 15; length of nasals, 57; greatest width of braincase, 96; upper tooth row, 43; lower tooth row, 44.

Two species only are known belonging to the next genus, one, the West Indian Seal, of the islands in the Gulf of Mexico and the Bahamas, and the other an inhabitant of the Mediterranean and adjacent portions of the Atlantic Ocean. Formerly the West Indian Seal was found in many of the islands contained within the range of its distribution, but the same cause that has reduced the number of others of its relatives, who were dwellers of the sea, has also left but a comparatively few individuals to represent the species in our tropical waters, and it is probable that in a comparatively few years it will have entirely disappeared.

106. *Monachus*.

$$I. \frac{2-2}{2-2}; C. \frac{1-1}{1-1}; P. \frac{4-4}{4-4}; M. \frac{1-1}{1-1} = 32.$$

Monachus Flem., Phil. Zoöl., II, 1822, p. 187. Type *Phoca monachus* Hermann.

Pelagios F. Cuv. Mém. Mus. Hist. Nat. Paris, XI, 1824, p. 193, pl. 13, fig. 2, *Id.* Dict. Scien. Nat., XXXIX, 1826, pp. 549-550.

Pelagocyon Glog., Hand. u. Hilfsb. Naturgesch., 1841, pp. xxxiv, 163.

Rigoon, Gistel, Naturg. Thiere., 1848, p. x.

Heliophoca Gray, Ann. Mag. Nat. Hist., 2d Ser., XIII, 1854, p. 201.

Muzzle elongate, depressed; nasals short; well developed nails on anterior digits, rudimentary on posterior; pelage short, stiff; palms and soles naked. Canines large: molars conical, lobes imperfect; the three posterior molars two-rooted. Incisors notched transversely interiorly.



MONACHUS TROPICALIS.

No. 102536 U. S. Nat. Mus. Coll. ♂ nat. size



MONACHUS TROPICALIS.

No. 102536 U. S. Nat. Mus. Coll. $\frac{2}{3}$ nat. size.



MONACHUS TROPICALIS.

No. 102536 U. S. Nat. Mus. Coll. ♂ nat. size.

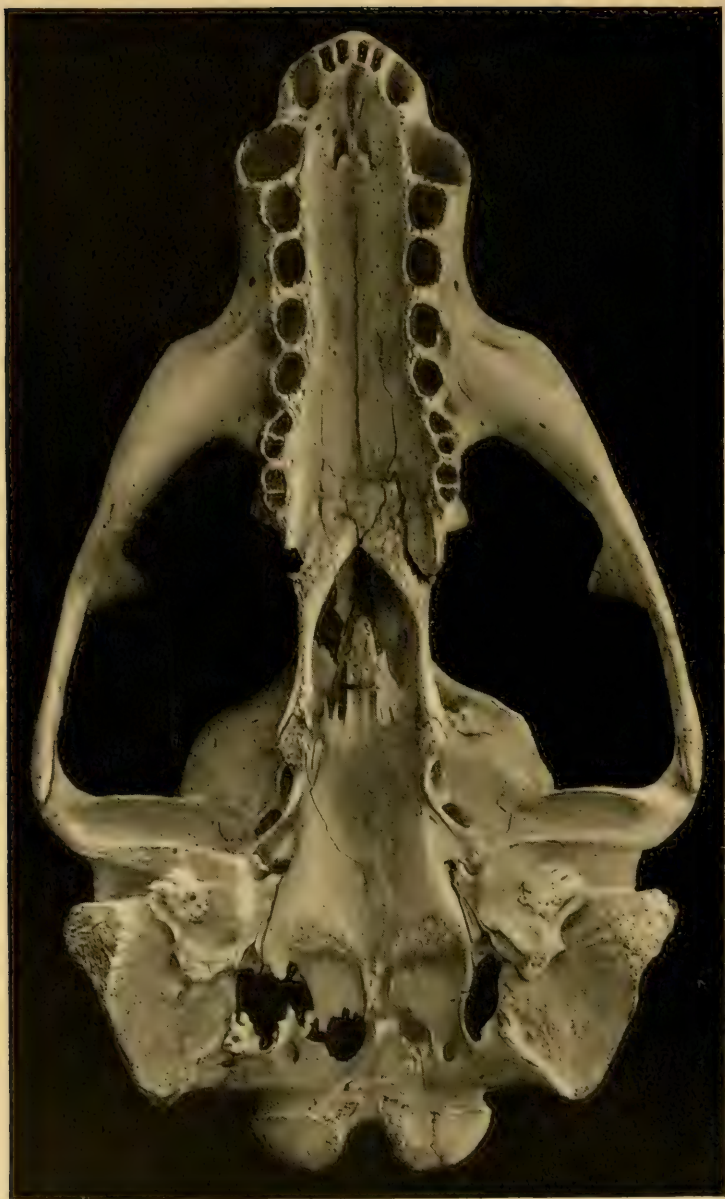


MONACHUS TROPICALIS.

No. 1025, U. S. Nat. Mus. Coll. Skull in nat. size



ARCTOCEPHALUS TOWNSENDI.
No. 83617 U. S. Nat. Mus. Coll. $\frac{2}{3}$ nat. size.



ARCTOCEPHALUS TOWNSENDI.
No. 83617 U. S. Nat. Mus. Coll. $\frac{2}{3}$ nat. size.



ARCTOCEPHALUS TOWNSENDI.
No. 83617 U. S. Nat. Mus. Coll. 3 nat. size.

509. tropicalis (*Phoca*), Gray, Cat. Seals, Brit. Mus., 1850, p. 28.

WEST INDIAN SEAL.

Type locality. Island of Jamaica.

Geogr. Distr. Formerly from islands off coast of Yucatan, Mexico, to Bay of Honduras and eastward to Jamaica, Cuba, Florida Keys and the Bahamas. At present found only on some Keys north of Cuba and on some scattered islands between Cuba and Yucatan.

Genl. Char. Whiskers long, flexible; pelage short, stiff; well developed nails on anterior digits; small on those of the pes; muzzle elongated, depressed; soles and palms naked.

Color. Above brown tinged with gray; sides lighter, grading into yellowish white on the under parts; edge of under lip, front and sides of muzzle yellowish white; limbs brown tinged with gray.

Measurements. Total length (nose to end of hind limbs), 2390; length of manus, 300; of pes, 320.

The Fur Seals are best known by the northern animals whose skin has such a high commercial value and whose rookeries or breeding places on the St. George and St. Paul islands of the Pribilof group, are familiar to so many. On a few places like the Guadalupe Island off the coast of Lower California, the Gallapagos Islands, and sundry others about the coasts of Africa, Australia, and New Zealand, a few members of the once great herds of the Southern Fur Seal may still remain, but they seem to be rapidly decreasing in numbers, and recent expeditions have failed to find any living individuals on some of the islands mentioned above, and have been able to bring back only skulls or parts of skeletons. Like other animals whose fur has a high commercial value, the prospect that these animals have for surviving the rapacity of man is but slight.

107. *Arctocephalus*. Sea-bears.

$$I. \frac{3-3}{2-2}, C. \frac{1-1}{1-1}, P. \frac{4-4}{4-4}, M. \frac{1-1}{1-1} \text{ or } \frac{2-2}{1-1} = 34 \text{ or } 36.$$

Arctocephalus F. Cuv., Dist. Scien. Nat., xxxix, 1826, p. 554.

Type Phoca ursina Linnæus.

Halarctus Gill, Proc. Essex Inst., v, 1866, p. 7.

Arctophoca Peters, Monatsb. Preuss. Ak. Wiss. Berl., 1866, p.

276. Taf. II. A, B, C.

Eutaria Gray, Ann. Mag. Nat. Hist., 3d Ser., xviii, 1866, p. 236.

Gypsophoca Gray, Ann. Mag. Nat. Hist., 3d Ser., xviii, 1866, p.

236.

Skull: slender, with facial portion elongate.



FIG. LXXIX. GROUP OF FUR SEALS OR SEA-BEARS.

510. townsendi (*Arctocephalus*), Merr., Proc. Biol. Soc. Wash., 1897, p. 178.

GUADALUPE FUR SEAL.

Type locality. Guadalupe Island, coast of Lower California, Mexico.

Geogr. Distr. Guadalupe and San Benito Islands, coast of Lower California, Mexico.

Genl. Char. Skull: palate narrow, excavated; bullæ flat; ascending arm of premaxilla short and thick; zygomatic root of maxilla expanded broadly. Upper molars double-rooted, posterior upper premolar incompletely double-rooted.

Color. Skull alone preserved.

Measurements. Basal length, 256; length of Hensel, 233; palatal length, 120; post-palatal length, 125; zygomatic breadth, 151; length of tooth row, 88; distance between canines, 22.5.

There are but two species known belonging to the next genus, the huge Sea-elephants of the islands off the coast of Upper and



MIROUNGA ANGUSTIROSTRIS.
No. 445 Field Columbian Mus. Coll. $\frac{2}{3}$ nat. size.



MIROUNGA ANGUSTIROSTRIS.
No. 445 Field Columbian Mus. Coll. $\frac{1}{2}$ nat. size.



MIROUNGA ANGUSTIROSTRIS.
No. 445 Field Columbian Mus. Coll. $\frac{1}{3}$ nat. size.



MIRONGA ANGUSTIROSTRIS.
No. 445 Field Columbian Mus. Coll. $\frac{2}{3}$ nat. size.

Lower California and Patagonia. They are enormous creatures rivaling the Walrus in bulk and stated to reach twenty-five to thirty feet in length. This great size, however, is found only in the animal from Heard's Island near the Patagonian coast. Their circumference is said to reach eighteen feet. Probably the individual variation among them is very great, and the females are much smaller than the males. The young and the females have no proboscis, but the males have one that in moments of excitement can be elongated to the extent of twenty inches or more. Formerly it is probable that these animals were quite numerous in the localities they frequented, but incessant slaughter has so reduced their numbers that the northern species is even now practically extinct, and the southern one has disappeared from some of its customary haunts. It is to be much regretted that man's insatiable greed is gradually exterminating the more valuable animals from the earth.

Subfam. I. **Cystophorinæ.**

108. Mirounga.

$$I. \frac{2-2}{1-1}; C. \frac{1-1}{1-1}; P. \frac{4-4}{4-4}; M. \frac{1-1}{1-1} = 30.$$

Mirounga Gray, in Griff., Cuvier's Anim. King., v, 1827, p. 179.

(Part.) Type *Phoca proboscidea* Péron = *Phoca leonina* Linnæus.

Macrorhinus F. Cuv., Dict. Scien. Nat., xxxix, 1826, p. 552.

(nec Latreille Coleopt. 1825.)

Rhinophoca Wagl., Nat. Syst. Amph., 1830, p. 27.

Morunga Gray, List Ost. Spec. Brit. Mus., 1847, p. 33.

Teeth small, one-rooted; hind feet without nails; nose of adult male elongated into a tubular proboscis capable of dilatation and extension; palate short, emarginate.

511. angustirostris (*Macrorhinus*), Gill, Proc. Chicago Acad. Scien., 1866, p. 33. Elliot, Syn. N. Am. Mamm., 1901, p. 359.

ELEPHANT SEAL.

Type locality. St. Bartholomew's Bay, Lower California, Mexico.

Geogr. Distr. Formerly from Cape Lazaro, Mexico, to Point Reyes, coast of California. Now practically extinct.

Genl. Char. Superior outline of skull irregularly arched from the lambdoidal suture to end of the nasals; snout of male lengthened, narrowed at end, widest behind last molar and equal to three and a half times the total length of skull; squamosal truncate above the meatus auditorius; palatines short, the posterior sinus semi-oval, the bottom being about midway between the snout and the line of the jugular foramina; maxillæ deeply incurved, line of molars



FIG. LXXX. MIROUNGA ANGUSTIROSTRIS. SEA-ELEPHANT.

incurved; group of bristles over each eye; hind flippers emarginate, hairy, without nails.

Color. Light brown generally, becoming bluish after the hair is shed.

Measurements. Total length, male, 18–20 feet. Female, total length, 9 to 10 feet; length of posterior flippers, 1 foot to 1 foot 10 inches; fore flippers, 1 foot 2 inches to 1 foot 5 inches; tail, 2 feet 2½ inches; tip of nose to corner of mouth, ⅞ inch. Skull: male; occipito-nasal length, 245; Hensel, 282; palatal length, 141; from anterior edge of intermaxillæ to pterygoid hamuli, 205; greatest breadth of zygomata, 223; mastoid breadth, 182; length of nasals, 57; interorbital constriction, 40; greatest width of braincase, 50; length of lower jaw, 239; anterior edge of ramus to last molar, 82.

Order IX. **Insectivora. The Insectivores.**

G. E. Dobson, *Monograph of the Insectivora*, 1882.

G. E. Dobson, *Synopsis of the Soricidæ*, 1890.

C. H. Merriam, *Revision of the American Genera Blarina and Notiosorex and Synopsis of the American Shrews of the Genus Sorex*.
N. Am. Faun., No. 10, 1895.

G. S. Miller, *The Long-tailed Shrews of the Eastern United States*.
N. Am. Faun., No. 10, 1895.

The Order Insectivora comprises a number of mammals mostly quite small, with the muzzle projecting considerably beyond the end of the lower jaw, the majority of which are terrestrial, some aquatic, and others arboreal, with one genus (*Galeopithecus* of the Malay Peninsula and islands of the eastern Archipelago), containing two species, that have the ability to voyage through the air for brief distances by means of a membrane stretched between the limbs and body and which bears them up like a parachute, after the manner of the Flying Squirrels. The Order is represented in the temperate portions of the Old and the New World save in South America and Australia, and with the exception of the members of one family, all are nocturnal. The exception is the *Tupaiidæ*, containing the Tree-shrews, which, as their trivial name implies, are arboreal creatures, very like squirrels in appearance and in many of their ways, and there are instances where some of them mimic the general dress of a certain species of squirrel so closely, that it is impossible to distinguish one from the other unless on a near inspection. As indicated by the name bestowed upon these creatures, Insectivorous Mammals, they subsist upon insects mainly, though *Potomogale velox* from West Africa is admirably formed for an aquatic life, and is said to live on fish, while the chief diet of moles is earth worms. Fruits at times are also eaten by them, and flesh when they can get it. Glands giving forth a noxious odor exist in many of the species, and these probably are a means of protection. In American shrews these glands are placed usually on the sides of the body, but members of some of the foreign genera have anal pouches which discharge their secretion through ducts. While usually possessing a furry coat, some species of the Order are protected by spines, which like miniature quills of the Porcupine are short and pointed, and when danger approaches the animal rolls itself into a ball leaving no soft part visible, the menacing spines standing out in all directions. The teeth are peculiar, and in numerous species the canines, incisors and nearest premolars

are not especially differentiated, so that it is difficult to tell one from the other. The molars have numerous sharp cusps arranged in a V or W-shaped pattern, and the crowns may be either quadrangular or triangular. The incisors are always four in the mandible and the innermost pair is often larger than the canines. The toes are furnished with claws, and are usually five on each foot, with the thumb and great toe not opposable to the other digits. The greater portion of the sole of the foot is placed upon the ground, and they never walk upon the toes. The upper surface of the brain is smooth, and the testes are situated near the kidneys and are not placed in a scrotum. Only three families of the Order come within the scope of this work, the SORICIDÆ or Shrews, TALPIDÆ or Moles, and the SOLENODONTIDÆ or Solenodons, of which last but two species are known, the curious *Almiqui* of Cuba, and the *Agouta* of Haiti.

The largest family of the Insectivora is the SORICIDÆ, which comprises over half the known species. The body is hairy, the nose is long and overhangs the mouth, and the animals are very mouse-like in appearance, while some of the species are among the smallest of the Mammalia. Shrews are very widely distributed in both Hemispheres, and possess a very uniform structure. These little animals live chiefly in the forests, and are also found in marshy places, sometimes in cultivated fields. They do not confine themselves by any means to an insectivorous diet, but devour worms, small birds, or any scraps of meat that fall in their way. Their own bodies are rejected as food by other quadrupeds, the secretions from their glands making them too offensive. American Shrews have been divided into several genera, two of which, NEOSOREX and ATOPHYRAX, contain species that are aquatic in their habits.

Fam. I. **Soricidæ. Shrews.**

Skull: long, narrow; no zygomatic arches, nor postorbital processes; tympanic not forming a bulla. Upper molar cusps with pattern like a W; first upper incisor large and hook-like with basal cusp on posterior border; no cæcum; pubic arch closed; tibia and fibula united. Nose long, overhanging the mouth.

Subfam. I. **Soricinæ.**

Summits of teeth colored red.

Sorex is the largest genus of the family, and is very numerously represented in North America, the species ranging from northern Alaska and Hudson Bay south into Mexico. Many of the named forms have a very close resemblance to each other, and probably too

many have been given even a subspecific rank. Increased knowledge and more familiarity with series of specimens will eventually correct whatever errors have been committed.

109. *Sorex*. Common Shrews.

$$L_{2-4}^{4-4}, C_{6-0}^{1-1}, P_{1-1}^{2-2}, M_{3-3}^{3-3} = 32.$$

Sorex Linn., Syst. Nat., 1, 1758, p. 53; 1, 1766, p. 73. Type *Sorex araneus* Linnæus.

Anotus Wagn., Suppl. Schreib. Säugth., v, 1855, p. 550. (nec Rafin., 1815, Rodentia.)

Ear conch well developed; tail long; inner side of canine and incisor without secondary cusps; braincase rather broad; mandible fragile; feet without fringe.



FIG. 102. *SOSEX ORINUS*.

No. 10843 Field Columbian Mus. Enlarged $2\frac{1}{2}$ times.

Tooth rows enlarged 7 times.

KEY TO SPECIES AND SUBSPECIES.

A. Size small; total length, 105 mm. or less.	PAGE
a. Beneath ashy gray..... <i>S. orizabæ</i>	550
b. Beneath drab..... <i>S. orcopolus</i>	550
c. Beneath chestnut..... <i>S. obscurus ventralis</i>	550
d. Beneath seal brown.	
a.' Rump dark sepia brown..... <i>S. salvini</i>	551

	PAGE
b.' Rump paler mixed brown and dusky <i>S. stizodon</i>	551
c. Beneath dark gray or blackish <i>S. orinus</i>	553
B. Size large; total length, 118 mm. or over.	
a. Hind foot 15 mm. or over.	
a.' Beneath pale dusky brown; above black . . . <i>S. veræpacis</i>	551
b.' Beneath seal brown.	
a.'' Above sepia and black <i>S. macrodon</i>	552
b.'' Above sepia brown tinged with chest-nut <i>S. godmani</i>	552
c.'' Above sepia brown and dusky <i>S. sclateri</i>	552
b. Hind foot less than 15 mm.	
a.' Beneath drab gray; tail 47 mm. <i>S. saussurii</i>	553
b.' Beneath seal brown; tail 57 mm. <i>S. s. mutabilis</i>	553

512. orizabæ (*Sorex*), Merr., N. Am. Faun., No. 10, 1895, p. 71.

MINUTE SHREW.

Type locality. Mount Orizaba, State of Puebla, Mexico. Altitude, 9,500 feet.

Geogr. Distr. Southern Mexico, States of Puebla, Tlaxcala, Vera Cruz, Mexico, and Michoacan.

Genl. Char. Size very small; belly pale color.

Color. Above sepia brown and dusky, darkest on hinder back; beneath ashy gray; tail brown above, whitish beneath.

Measurements. Total length, 103; tail vertebræ, 38; hind foot, 13.

513. oreopolus (*Sorex*), Merr., Proc. Biol. Soc. Wash., VII, 1892, p. 173.

LOFTY MOUNTAIN SHREW.

Type locality. North slope of the Sierra Nevada de Colima, State of Jalisco, Mexico. Altitude, 10,000 feet.

Geogr. Distr. State of Jalisco, Mexico.

Genl. Char. Similar to *S. obscurus*, but tail shorter; colors darker.

Color. Above mixed sepia brown and dusky; beneath drab; tail above dusky, beneath whitish.

Measurements. Total length (average), 104.7; tail vertebræ, 36.3; hind foot, 13.7. (Merr., l. c.)

obscurus ventralis (*Sorex*), Merr., N. Am. Faun., No. 10, 1895, p. 75.

CHESTNUT-BELLIED SHREW.

Type locality. Cerro San Felipe, State of Oaxaca, Mexico. Altitude, 10,000 feet.

Geogr. Distr. State of Oaxaca, Mexico.

Genl. Char. Size small; tail short; similar to *S. obscurus*, but darker; molariform teeth larger.



FIG. LXXXI. SOREX O. VENTRALIS.
No. 8688 Field Columbian Mus. Coll.

Color. Upper parts mixed brown and dusky; under parts chestnut; tail above dusky, beneath whitish.

Measurements. Total length, 104; tail vertebræ, 37; hind foot, 13.

514. salvini (*Sorex*), Merr., Proc. Biol. Soc. Wash., XI, 1897, p. 229.

SALVIN'S SHREW.

Type locality. Cael, Totonicapan, Guatemala. Altitude, 10,200 feet.

Genl. Char. Small; ears rather large; tail short; first and second unicuspid subequal.

Color. Above dark sepia brown, darkest on rump; beneath seal brown; tail bicolor.

Measurements. Total length, 104; tail vertebræ, 41; hind foot, 13.5.

515. stizodon (*Sorex*), Merr., N. Amer. Faun., No. 10, 1895, p. 98.

SAN CHRISTOBAL SHREW.

Type locality. San Christobal, State of Chiapas, Mexico.

Geogr. Distr. State of Chiapas, Mexico.

Genl. Char. Similar to *S. saussurii*, but smaller.

Color. Above mixed sepia brown and dusky; beneath seal brown; tail above dusky, beneath pale.

Measurements. Total length, 105; tail vertebræ, 38; hind foot, 12.

516. veræpaci (*Sorex*), Alston, Proc. Zool. Soc., 1877, p. 445.

GUATEMALAN SHREW.

Type locality. Coban, Guatemala.

Geogr. Distr. Guatemala, Central America.

Genl. Char. Ears moderate, thickly clothed; tail long, hairy; first upper incisor stout, with internal cusp; lower incisor with one prominent and one nearly obsolete internal cusp; second to fourth upper incisors diminishing in size; premolar very small; second and third upper molars with distinct cusp; lower premolar and molars with one inner and two outer cusps each.

Color. Uniform dark dusky brown, slightly paler beneath; tail and feet dusky; fur dark slate color at base.

Measurements. Total length, 140; tail, 50; hind foot, 12.

517. macrodon (*Sorex*), Merr., N. Amer. Faun., No. 10, 1895, p. 82.
LARGE-TOOTHED SHREW.

Type locality. Orizaba, State of Vera Cruz, Mexico. Altitude, 4,200 feet.

Geogr. Distr. State of Vera Cruz, Mexico.

Genl. Char. Like *S. caudatus*; skull and teeth larger.

Color. Above mixed sepia and black; beneath seal brown; tail above blackish, beneath paler; feet blackish.

Measurements. Total length, 128; tail vertebræ, 52; hind foot, 15.5. Skull: total length, 20; width, 9.5.

518. godmani (*Sorex*), Merr., Proc. Biol. Soc. Wash., XI, 1897, p. 229.
GODMAN'S SHREW.

Type locality. Volcano Santa Maria, Quezaltenango, Guatemala. Altitude, 9,000 feet.

Genl. Char. Similar to *S. stizodon*, but larger, tail longer; second unicuspid not larger than the first; molariform teeth deeply excavated posteriorly.

Color. Above uniform sepia brown, tinged with chestnut; beneath seal brown; tail dark, unicolor.

Measurements. Total length, 120; tail vertebræ, 57; hind foot, 15. Skull: total length, 18; width, 8.

519. sclateri (*Sorex*), Merr., Proc. Biol. Soc. Wash., XI, 1897, p. 228.
SCLATER'S SHREW.

Type locality. Tumbala, State of Chiapas, Mexico. Altitude, 5,000 feet.

Geogr. Distr. State of Chiapas, Mexico.

Genl. Char. Size large; tail long; hind foot long. Skull large, long, and slender.

Color. Above mixed sepia brown and dusky, beneath seal brown; tail above dusky, beneath paler; feet dusky.

Measurements. Total length, 126; tail vertebrae, 52; hind foot, 16. Skull: total length, 20; width, 9.

520. saussurii (Sorex), Merr., Proc. Biol. Soc. Wash., VII, 1892, p. 173.

SAUSSURE'S SHREW.

Type locality. North slope of the Sierra Nevada de Colima, State of Jalisco, Mexico. Altitude, 8,000 feet.

Geogr. Distr. State of Jalisco, Mexico.

Genl. Char. Size large; tail short. Skull large, rostrum high, swollen; third unicuspid smaller than fourth; palate narrow; post-palatal notch broad.

Color. Above mixed sepia brown and dusky; beneath drab gray; belly clouded; tail dark brown above, paler beneath.

Measurements. Total length (average), 118.5; tail vertebrae, 47; hind foot, 14.5. (Merr., l. c.)

a. —mutabilis (Sorex), Merr., Science, N. S., VIII, 1898, p. 782.

caudatus (Sorex), Merr., N. Amer. Faun., No. 10, 1895, p. 84. (nec Hodgson, 1851.)

CHANGEABLE SHREW.

Type locality. Reyes, State of Oaxaca, Mexico. Altitude, 10,200 feet.

Geogr. Distr. State of Vera Cruz to that of Oaxaca, Mexico.

Genl. Char. Like *S. saussurii*, but tail longer; third unicuspid slightly smaller than fourth.

Color. Above mixed sepia and black; beneath seal brown; tail and feet blackish, the former brownish beneath.

Measurements. Total length, 126; tail vertebrae, 57; hind foot, 14.5.

521. orinus (Sorex), Elliot, Pub. Field Columb. Mus., III, 1903, p. 172. Zoölogy.

MOUNTAIN SHREW.

Type locality. Ajuaje de las Fresas, San Pedro Martir Mountains, Lower California, Mexico. Altitude, 6,000 feet.

Genl. Char. Similar to *S. vagrans*, but darker, without russet color and much darker under parts. Skull with shorter rostrum, flatter braincase, lower occipital region, and smaller teeth.

Color. Upper parts sepia, beneath dark gray or blackish; hands and feet whitish; ears sepia.

Measurements. Total length, 103; tail vertebrae, 43; hind foot, 12; ear, 6. Skull: occipito-nasal length, 15; Hensel, 14; interorbital constriction, 3; length of rostrum, 9.5; palatal length, 6.

110. *Notiosorex*.

$$I. \frac{3-3}{2-2}; C. \frac{1-1}{0-0}; P. \frac{1-1}{1-1}; M. \frac{3-3}{3-3} = 28.$$

Notiosorex Baird in Coues Notes Insect. Mamm., Bull. U. S. Geol. & Geog. Surv. Terr., III, 1877, p. 646. Type *Sorex crawfordi* Coues.

Third unicuspid half the size of second; all narrow at base, inner side without secondary cusplet; anterior teeth orange at tips; molars white; cranium flat, rounded on sides; tail short, not half as long as head and body.



FIG. 103. *NOTIOSOREX GIGAS*.
No. 88012 U. S. Nat. Mus. Coll. Twice nat. size.

KEY TO THE SPECIES AND SUBSPECIES.

A. Size small.	PAGE
a. Above olive gray; tail, 26 mm.	<i>N. crawfordi</i> 554
b. Above plumbeous; tail short, 23 mm.	<i>N. c. exotis</i> 555
B. Size large.	
a. Above slate gray; beneath paler tinged with brown; tail long, 45 mm.	<i>N. gigas</i> 555

522. crawfordi (*Sorex*), Coues, Bull. U. S. Geol. & Geog. Surv. Terr., III, 1877, p. 651. Elliot, Syn. N. Am. Mamm., 1901, p. 385.
CRAWFORD'S SHREW.

Type locality. Near Old Fort Bliss, two miles above El Paso, El Paso County, Texas.

Geogr. Distr. Eastern Texas to southern California, and on northern boundary line of Mexico at Monument 66. (Mearns.)

Genl. Char. Size small; ears large, conspicuous; hind feet and tail short; other characters same as those of the genus.

Color. Above olive gray, beneath whitish; tail bicolor, agreeing above and below with the hues of the body.

Measurements. Total length, 82; tail vertebræ, 26; hind foot, 10.5; ear, 6.5. Skull: total length to end of incisors, 17.3; greatest breadth, 8.

a.—evotis (Sorex), Coues, Bull. U. S. Geol. & Geog. Surv. Terr., III, 1877, p. 652.

MAZATLAN SHREW.

Type locality. Mazatlan, State of Sinaloa, Mexico.

Geogr. Distr. State of Sinaloa, Mexico; range unknown.

Genl. Char. Larger and darker than *N. crawfordi*.

Color. Above plumbeous; tip of hairs brownish; beneath whitish.

Measurements. Total length, 73; tail vertebræ, 23; hind foot, 11.5.

523. *gigas* (*Notiosorex*), MERR., Proc. Biol. Soc. Wash., XI, 1897, p. 227.
GIANT SHREW.

Type locality. Mountains of Milpillas near San Sebastian, State of Jalisco, Mexico.

Geogr. Distr. Mountains of Milpillas, near San Sebastian, State of Jalisco, Mexico; range unknown.

Genl. Char. Larger than *N. crawfordi*, tail longer. Skull: brain-case highly arched; teeth white throughout; molars crowded.

Color. Uniform slate gray above, paler beneath with a tinge of brown on the belly; tail like dorsal and ventral portions of body.

Measurements. Total length, 128; tail vertebræ, 45; hind foot, 15. Skull: total length, 23; greatest breadth, 10.5.

The next genus contains the largest of the American Shrews whose habits are nowise aquatic, but the various members are not all built on the same generous plan, for some of the species are of moderate size, one, indeed, being very small.

111. *Blarina*. Shrews.

$$I \frac{4-4}{2-2}, \text{ or } \frac{3-3}{2-2}; C \frac{1-1}{0-0}; P \frac{2-2}{1-1}; M \frac{3-3}{3-3} = 32 \text{ or } 30.$$

Blarina Gray, Proc. Zoöl. Soc., 1837, p. 124. Type *Sorex talpoides* Gapper = *S. brevicaudus* Say.

Brachysorex Duvern, Mag. Zoöl., 2me Sér., IV, 1842, p. 37. Pl. 52.

Blaria Gray, List Spec. Mamm. Brit. Mus., 1843, p. XXI.

Talposorex Pomel, Archiv. Scien. Phys. & Nat. Bibl. Univ. Genève, IX, 1848, p. 248.

Cryptotis Pomel, Archiv. Scien. Phys. & Nat. Bibl. Univ. Genève, IX, 1848, p. 249.

Galemys (nec Kaup) Pomel, Archiv. Scien. Phys. & Nat. Bibl. Univ. Genève, IX, 1848, p. 249. (Part.)

Anotus Wagn., Supp. Schreb. Säugeth, 1855, p. 550.

Soriciscus Coues, Bull. U. S. Geol. & Geog. Surv. Terr., 1877, p. 649.

Ear conch truncate above; tail short; fourth upper incisor rudimentary or absent; first and second unicuspid largest, subequal; middle incisor with elongate basal lobe; braincase highest at lambdoidal suture.



FIG. 104. *BLARINA PERGRACILIS*. TYPE.
No. 8689 Field Columbian Mus. Enlarged $2\frac{1}{4}$ times.
Tooth rows enlarged 6 times.

KEY TO THE SPECIES AND SUBSPECIES.

A. Size small, total length less than 100 mm.

a. Tail less than half as long as the head and body.

a.'	Above blackish olive brown, beneath pale grayish brown.....	<i>B. pergracilis</i>	557
b.'	Above ash brown, beneath grayish.....	<i>B. b. berlandieri</i>	558
c.'	Above and beneath blackish.....	<i>B. nigrescens</i>	558

d.'	Above cinnamon hair brown, beneath ashy	<i>B. tropicalis</i>	559
e.'	Above dark plumbeous, beneath paler tinged with brown	<i>B. obscura</i>	559
b.	Tail nearly half as long as the head and body.		
a.'	Above dark brown, beneath smoky gray . . .	<i>B. oreophila</i>	559
b.'	Above sooty black, beneath brownish	<i>B. soricina</i>	560
B.	Size medium, total length 111 mm., or less; hind foot 13 mm. or over.		
a.	Total length less than 107 mm., but over 100 mm.		
a'	Hind foot 13 mm.		
a."	Braincase highly elevated above rostrum	<i>B. mexicana</i>	560
b."	Braincase slightly elevated above rostrum	<i>B. m. goldmani</i>	560
b'	Hind foot 15 mm.		
a."	Unicuspid without inner cusplets.	<i>B. m. peregrina</i>	560
b."	Unicuspid with inner cusplets.		
a'''	Above sooty black, paler beneath.	<i>B. m. machetes</i>	561
b'''	Above grizzled plumbeous, beneath washed with ashy brown	<i>B. mayensis</i>	561
b.	Total length 107 mm., or over.		
a'	Hind foot over 13 mm., but less than 15 mm.	<i>B. nelsoni</i>	561
b'	Hind foot 15 mm.		
a."	Large upper premolar with antero-internal angle.	<i>B. alticola</i>	561
b."	Large upper premolar without antero-internal angle.	<i>B. fossor</i>	562
C.	Size very large, total length over 130 mm.	<i>B. magna</i>	562

A. Cryptotis.

Teeth 30; unicuspid 4, never in two pairs, fourth smallest; basal lobe of middle incisor a rounded cusp; braincase highest anterior to lambdoidal suture; occipital plane arched.

524. pergracilis (*Blarina*), Elliot, Publ. Field Columb. Mus., III, 1903, p. 149.

OCOTLAN SLENDER SHREW.

Type locality. Ocotlan, State of Jalisco, Mexico.

Genl. Char. Smallest of the genus. Skull: very slender, similar to that of *B. b. berlandieri*, but with the rostrum much narrower; molars smaller. Color very different.



FIG. LXXXII. *BLARINA PERGRACILIS*. OCOTLAN SLENDER SHREW.
No. 8689 Field Columbian Mus. Coll.

Color. Above blackish olive brown, beneath pale grayish brown.

Measurements. Total length, 81; tail vertebræ, 20; hind foot, 10. Skull: total length, 16; Hensel, 13; mastoid breadth, 7; palatal length, 6.

brevicauda berlandieri (*Blarina*), Baird, N. Amer. Mamm., 1857.
p. 53. Merr., N. Am. Faun., No. 10, 1895, p. 20.

BERLANDIER'S SHREW.

Type locality. Matamoros, State of Tamaulipas, Mexico.

Geogr. Distr. State of Tamaulipas, Mexico, north into Texas.

Genl. Char. Upper first and second molars but slightly concave behind. Very similar to *B. parva*.

Color. Above ash brown; beneath grayish.

Measurements. Total length, (average six specimens) 83; tail vertebræ, 19; hind foot, 12. Skull: greatest length to tip of incisors, 16.8; greatest breadth, 7.8.

525. *nigrescens* (*Blarina*), Allen, Bull. Am. Mus. Nat. Hist., 1895,
p. 339.

micrura, Allen, Bull. Am. Mus. Nat. Hist., 1893, p. 338. (nec Thomas.)

BLACK SHREW.

Type locality. San Isidro (San José,) Costa Rica.

Geogr. Distr. Known only from type locality.

Genl. Char. Pelage coarse, long, dull; tail about one-third the length of the head and body, nearly naked.

Color. Above dusky plumbeous, in some lights black; lower surface not appreciably different; feet and tail blackish, nearly naked, the annulations of the latter being distinctly visible.

Measurements. Total length, 87; tail vertebræ, 22; hind foot, 12. Skull: total length, 20; mastoid breadth, 9.5; length of nasals, 7; length of upper tooth row, 9; between outer edge of last molars, 6.3.

526. tropicalis (*Blarina*), Merr., N. Amer. Faun., No. 10, 1895, p. 21.

tropicalis (*Corsira*), Gray, Proc. Zool. Soc., 1843, p. 79. *Nomen nudum*.

micrura Alston, Proc. Zool. Soc., 1877, p. 446.

TROPICAL SHREW.

Type locality. Coban, Guatemala. Altitude, 4,400 feet.

Geogr. Distr. States of Vera Cruz and Oaxaca, Mexico, into Guatemala.

Genl. Char. Size very small; tail less than half the length of head and body.

Color. Above cinereous hair brown, beneath ashy.

Measurements. Total length, 83; tail vertebræ, 23; hind foot, 11.4.

527. obscura (*Blarina*), Merr., N. Amer. Faun., No. 10, 1895, p. 23.

DUSKY SHREW.

Type locality. Tulancingo, State of Hidalgo, Mexico. Altitude, 8,500 feet.

Geogr. Distr. State of Hidalgo, Mexico.

Genl. Char. Smaller and paler than *B. mexicana*; skull and teeth similar but smaller.

Color. Above dark plumbeous; beneath lighter tinged with brownish.

Measurements. Total length, 89; tail vertebræ, 24; hind foot, 13.

528. oreophila.

oreophila! (*Blarina*), Allen, Bull. Am. Mus. Nat. Hist., 1895, p. 340.

VOLCANO OF IRAZÚ SHREW.

Type locality. Volcan de Irazú, Costa Rica, Central America.

Geogr. Distr. Known only from type locality.

Genl. Char. Pelage soft, glossy; ears rudimentary; tail nearly half as long as the head and body. Similar to *B. cinerea*, but smaller.

Color. Above dark brown; sides paler; under parts smoke gray; tail dusky above, paler beneath; feet grayish brown.

Measurements. Total length, 76; tail vertebræ, 21; hind foot, 11. Skull: length of nasals, 5; upper tooth row, 8; distance between outer border of last molars, 5.5.

529. soricina (*Blarina*), Merr., N. Am. Faun., No. 10, 1895, p. 22.

TLALPAM SHREW.

Type locality. Tlalpam, Valley of Mexico, ten miles south of Mexico City. Altitude, 7,600 feet.

Geogr. Distr. State of Mexico; range unknown.

Genl. Char. Similar to *B. tropicalis*, but darker; third unicuspid with chestnut-tipped cusplet on inner side; large upper premolar deeply excavated posteriorly.

Color. Above sooty black; beneath brownish.

Measurements. Total length, 88; tail vertebræ, 26.5; hind foot, 12.5.

530. mexicana (*Blarina*), Coues, Bull. U. S. Geol. and Geog. Surv.

Terr., III, 1877, p. 652.

COUES' MEXICAN SHREW.

Type locality. Jalapa, State of Vera Cruz, Mexico.

Geogr. Distr. States of Vera Cruz and Oaxaca, Mexico.

Genl. Char. Medium size, dark coloration. Skull like that of *B. carolinensis*, but higher in occipital region and braincase; upper second molar with postero-internal lobe smaller than the antero-internal.

Color. Above sooty, back and rump darkest; beneath tinged with brownish; tail and feet blackish.

Measurements. Total length, (average) 99; tail vertebræ, 27; hind foot, 13.3.

a.—goldmani (*Blarina*), Merr., N. Am. Faun., No. 10, 1895, p. 25.

GOLDMAN'S SHREW.

Type locality. Mountains near Chilpancingo, State of Guerrero, Mexico. Altitude, 10,000 feet.

Geogr. Distr. State of Guerrero, Mexico.

Genl. Char. Similar to *B. mexicana*, but under parts paler; braincase but slightly elevated above plane of rostrum.

Color. Above sooty plumbeous, rump darkest; beneath paler plumbeous.

Measurements. Total length, 100; tail vertebræ, 28; hind foot, 13.

b.—peregrina (*Blarina*), Merr., N. Am. Faun., No. 10, 1895, p. 24.

WANDERING SHREW.

Type locality. Mountains 15 miles west of Oaxaca, Mexico. Altitude, 9,500 feet.

Geogr. Distr. State of Oaxaca, Mexico.

Genl. Char. Similar to *B. mexicana*; postero-internal cusplet of the unicuspidate teeth nearly obsolete and without chestnut tip;

second upper molar with postero-internal lobe larger than antero-internal.

Color. Above sooty black; beneath paler.

Measurements. Total length, 106; tail vertebræ, 31; hind foot, 15.

c.—machetes (*Blarina*), Merr., N. Am. Faun., No. 10, 1895, p. 26.

WARRING SHREW.

Type locality. Mountains near Ozolotepec, State of Oaxaca, Mexico. Altitude, 10,000 feet.

Geogr. Distr. State of Oaxaca, Mexico.

Genl. Char. Similar to *B. mexicana*, but larger. Inner cusplet of unicuspid not chestnut-tipped; molars slightly varying from those of species named; large upper premolar longer, broader, and more excavated posteriorly, with antero-internal angle and cusp less developed; molars larger and more concave behind.

Color. Above sooty black, paler beneath.

Measurements. Total length, 104; tail vertebræ, 30.5; hind foot, 15.

531. mayensis (*Blarina*), Merr., Proc. Wash. Acad. Scien., III, 1901, p. 559.

MAYA SHREW.

Type locality. Maya ruin, Chichen Itza, Yucatan, Mexico.

Genl. Char. Similar to *B. mexicana*, but color different and unicuspidate teeth larger and broader. "Molariform teeth large, not excavated anteriorly or posteriorly; first and second unicuspid large and swollen, and with inner tubercle obsolete."

Color. Above plumbeous, grizzled; beneath plumbeous, washed with ashy brown.

Measurements. Total length, 102; tail vertebræ, 29; hind foot, 13.

532. nelsoni (*Blarina*), Merr., N. Am. Faun., No. 10, 1895, p. 26.

NELSON'S SHREW.

Type locality. Volcano of Tuxtla, State of Vera Cruz, Mexico. Altitude, 4,800 feet.

Geogr. Distr. State of Vera Cruz, Mexico.

Genl. Char. Similar to *B. mexicana*, with comparative dental differences; inner cusplet of the unicuspid obsolete; upper molariform teeth without posterior excavation.

Color. Uniform sooty brown.

Measurements. Total length, 110; tail vertebræ, 31; hind foot, 14.

533. alticola (*Blarina*), Merr., N. Am. Faun., No. 10, 1895, p. 27.

MT. POPOCATEPETL SHREW.

Type locality. Mt. Popocatepetl, State of Mexico. Altitude, 11,500 feet.

Geogr. Distr. State of Mexico, Mexico.

Genl. Char. Size larger than *B. mexicana*; hind foot large; large upper premolar with well-developed antero-internal angle and cusp.

Color. Above sooty plumbeous graduating into a paler shade beneath.

Measurements. Total length, 107; tail vertebrae, 26; hind foot, 15.

534. fossor (*Blarina*), Merr., N. Am. Faun., No. 10, 1895, p. 28.

MT. ZEMPOALTEPEC SHREW.

Type locality. Mt. Zempoaltepec, State of Oaxaca, Mexico. Altitude, 10,500 feet.

Geogr. Distr. 8,200–10,500 feet altitude on Mt. Zempoaltepec, State of Oaxaca, Mexico.

Genl. Char. Similar to *B. alticola*, but larger; upper molars narrow, the large upper premolars lacking the antero-internal angle, the tooth being narrow in front.

Color. Above sooty plumbeous; beneath paler and tinged with brown.

Measurements. Total length, 111; tail vertebrae, 29; hind foot, 15.

535. magna (*Blarina*), Merr., N. Am. Faun., No. 10, 1895, p. 28.

GREAT SHREW.

Type locality. Totontepec, State of Oaxaca, Mexico. Altitude, 6,800 feet.

Geogr. Distr. Mountains around Totontepec and Zempoaltepec, State of Oaxaca, Mexico. Altitude, 6,800 to 8,000 feet.

Genl. Char. Largest of the subgenus; tail scantily haired. Brain-case convex; unicuspid narrow with small inner cusplet; large upper premolar, short, broad; the antero-internal angle rounded.

Color. General color sooty brown, slightly paler underneath.

Measurements. Total length, 134; tail vertebrae, 42; hind foot, 17.

The next family comprises the Moles, which have strictly subterranean habits. Their underground dwelling-place is constructed with considerable skill and ingenuity and affords a convenient lair for rest or refuge. It has been described as a "central nest, placed under a hillock in some protected situation, as under a bank, or between the roots of trees. It is lined with dry grass or leaves, communicates with the main run by four passages, of which only one joins it directly leading downward for a short distance and then ascending again. The other three are directed upward and communicate at regular intervals with a circular gallery constructed in

the upper part of the hillock, which in turn communicates by five passages leading downward and upward with a much larger gallery placed lower down on a level with the central nest, from which passages proceed outward in different directions, only one communicating directly with the main run, while the other, curving round, either soon joins or ends blindly. The main run is somewhat wider than the animal's body; its walls are smooth and formed of closely compressed earth, the depth varying according to the nature of the soil, but ordinarily from four to six inches. From the main run numerous passages are formed on each side, along which the animal hunts its prey, throwing out the soil in the form known as mole-hills."

Moles are admirably adapted for their underground life, the fore limbs being short and exceedingly muscular, and their broad, naked hands, with the palms directed outward, make a most effective "shovel" for digging a passage through the earth. The body is covered with a short, dense, velvety fur, which almost entirely hides the eye; the head appears placed between the shoulders, and the ear has no conch. Moles are voracious feeders, and will eat almost any kind of flesh, although earthworms are their chief food. Vegetable matter they will not touch. Moles have from four to six young, the period of gestation being about six weeks. These animals are very pugnacious, and should two happen to meet in one of their underground roads, one must seek refuge in the nearest alley entering that road, or the combat that must inevitably ensue, would prove fatal to the weaker individual. Moles seem to be always hungry, and they soon die if made to fast, and should two be confined in one cage without food for any length of time, the stronger would devour the weaker. These animals are distributed in both Hemispheres, chiefly in the northern portions, and in North America they have not been found south of Mexico. While a majority of the known species of the Family are terrestrial in their habits, a few species confined to the Old World are aquatic. However, even the common Mole will sometimes venture into the water, for one was once seen paddling to a small island in the Loch of Cluny, Scotland, on which there were mole hills. Moles commit much damage in gardens and fields, and frequently greatly disfigure well-kept lawns and ornamental grounds by the unsightly mounds they raise above their tunnels.

Fam. II. **Talpidae. Moles.**

Body stout; neck apparently wanting; eyes minute; ears short, concealed in the fur; nostrils superior or lateral, sometimes terminal on the snout, and in one instance surrounded by a radiating fringe; limbs short, anterior the larger; manus broad and with powerful

claws; tail short; tibia and fibula united; first and second lower incisors not projected horizontally forwards; zygomatic arch present.

Subfam. I. **Talpinæ.**

Clavicle and humerus very short and broad; manus with a large falciform bone.

112. Scapanus.

$$I. \frac{3-3}{3-3}; C. \frac{1-1}{1-1}; P. \frac{4-4}{4-4}; M. \frac{3-3}{3-3} = 44.$$

Scapanus Pomel, Archiv. Sci. Phys. Nat. Bibl. Univ. Genève, ix, 1848, p. 247. Type *Scalops townsendi* Bachman.

Hand very broad, *os falciforme* large; palms presented outward; toes without webs; muzzle long; palate but slightly extended beyond last molar; first upper incisor large; internal basal cusps of molars narrow; bullæ complete; nostrils superior; tail short, terete, scaly; hairs scanty.

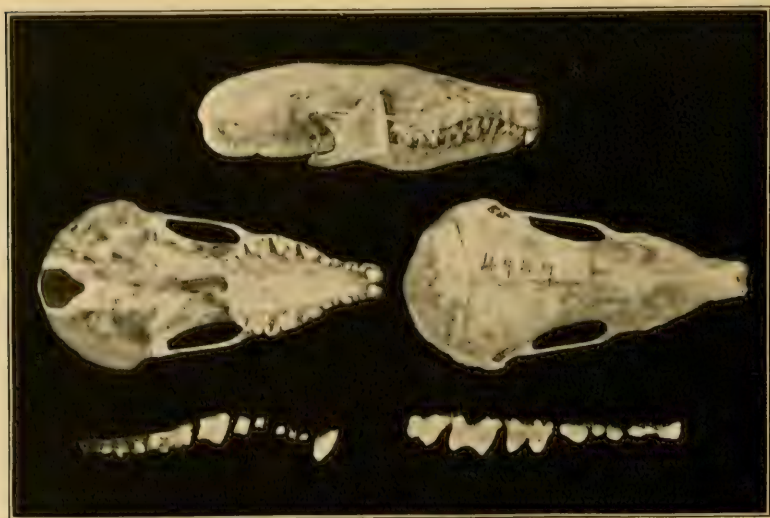


FIG. 105. **SCAPANUS ANTHONYI.**

No. 4947 Am. Mus. Nat. Hist. Coll. Enlarged $\frac{1}{2}$.

PROFILE UPPER TOOTH ROW
Enlarged 3 times.

FACE LOWER TOOTH ROW
Enlarged 3 times.

536. anthonyi (*Scapanus*), J. A. Allen, Bull. Am. Mus. Nat. Hist., v, 1893, p. 200.

LOWER CALIFORNIA MOLE.

Type locality. San Pedro Martir Mountains, Lower California, Mexico. Altitude, 7,000 feet.

Geogr. Distr. Known only from type locality.

Genl. Char. Smaller than *S. californicus*; color darker.

Color. Almost uniform black.

Measurements. Length, 135; tail, 26. Skull: extreme length, 30; basilar length, 28.5; interorbital constriction, 7.6; greatest mastoid breadth, 15.3; lower jaw, incisive border to condyle, 22.4.



FIG. LXXXIII. SCAPANUS ANTHONYI. ANTHONY'S MOLE.

But two living species of the next Family are known, and there are no extinct forms that can be associated with them. These curious creatures are rather large animals, about the length of a big house rat, but heavier, with rather long legs and claws. The snout is very long, extending far beyond the mouth, and the tail is also elongated. There are no spines amid the fur, which is soft, and the colors are brownish black and white. The species do not seem to be numerously represented, as comparatively few individuals have been taken, and specimens are very rarely seen in collections. Little is known of their habits, but it is stated that they will attack poultry, and if pursued, imitate the Ostrich by hiding the head in the first hole they find, and fancy themselves concealed. This idea may have arisen from an individual trying to enter a hole too small for its body, and remained only partly hidden until captured. The Cuban species is found among the mountains in the interior of the island. Of the Haitian species still less is known. The shape of the molar teeth connect these animals with the Centetidae, of which the Tenrec, *Centetes caudatus*, may be considered the representative.

Fam. III. **Solenodontidæ.**

Tail long, naked; snout cylindrical, elongate; feet armed with sharp claws, those on fore feet longest. Skull without zygomatic arch or postorbital processes; tympanic not forming a bulla; slight constriction behind orbits; squamosals expanded outward and forward; upper molars tritubercular; first upper incisor enlarged; second lower incisor hollowed internally; tibia and fibula distinct; mammae postinguinal.



FIG. 106. *SOLENOTON CUBANUS*.
No. 134 Field Columbian Mus. Coll. Nat. size.

113. Solenodon.

$$I. \frac{3-3}{3-3}, C. \frac{1-1}{1-1}, P. \frac{3-3}{3-3}, M. \frac{3-3}{3-3} = 40.$$

Solenodon Brandt, Mém. Acad. Imp. Scien., St. Petersb., 6th Ser II, 1833, p. 459. Type *Solenodon paradoxus* Brandt.

Characters same as those of the Family.

KEY TO THE SPECIES.

- | | |
|--|-------------------------|
| A. Size large; nose long, extending beyond mouth. | |
| a. Forehead, cheeks, throat, and sides of neck yellowish white | <i>S. cubanus</i> 567 |
| b. Forehead, sides of head, and neck yellowish brown, mixed with gray and ferrugineous . . . | <i>S. paradoxus</i> 568 |



FIG. LXXXIV. SOLENODON CUBANUS.

No. 134 Field Columbian Mus. Coll.

537. cubanus (*Solenodon*), Peters, Abh. K. Preuss. Akad. Wiss. Berl., 1863, p. 2, pl. III.

ALMIQUI.

Type locality. Island of Cuba.

Geogr. Distr. Island of Cuba.

Genl. Char. Nose long, extending beyond the mouth; tail long, scaly, naked.

Color. Forehead and stripe extending behind and beyond each ear, cheeks, throat and sides of neck yellowish white; top of head, upper parts and sides of body, outer side of arms and thighs jet black with numerous long white hairs scattered irregularly on sides and under parts, and extending beyond the others; under parts black with orange buff patches on lower part of chest and on the abdomen; inner side and top of arms from elbows, and legs from ankles sparsely

covered with short black hairs; nails white, very long on the fingers; fingers and toes blackish brown, nearly naked; tail naked; black; ears naked, black; under lip and end of nose naked.

Measurements. Total length, about 555; tail vertebræ, 190; hind foot, 70 (mounted specimen). Skull: occipito-nasal length, 77; Hensel, 66; mastoid breadth, 28; interorbital constriction, 14; median length of nasals, 19; palatal length, 37; postpalatal length, 28; length of upper tooth row, internal border, 32; length of mandible, incisive border to angle, 54; height at condyle, 12; at coronoid process, 23; lower tooth row, outer border, 28.

538. paradoxus (*Solenodon*), Brandt, Mem. Acad. Imp. Scien. St. Petersb., II, 1833, p. 459, pls. 1, 2.

AGOUTA.

Type locality. Island of Haiti.

Geogr. Distr. Island of Haiti.

Genl. Char. Nose long, naked; nostrils with crescentic apertures, inferior surface traversed by a medium longitudinal groove as far as incisors; ears rounded, broad as high; tail shorter than head and body, scaly, with minute hairs between scales; claws strong. Mammæ two, inguinal.

Color. Top of nose, forehead, top of head, back of neck and upper part of back brownish black; rest of back, blackish brown; side of head and neck pale yellowish brown mixed with gray and ferrugineous; abdomen and feet pale yellowish brown; tail scaly, gray with the tip whitish.

Measurements. Total length, 520.7; tail vertebræ, 228.6; hind foot, 60.9; ear, 38.1.

Order X. **Chiroptera. Bats.**

H. Allen, *A Monograph of the Bats of North America*, 1864, 2d ed. 1893, Bull. U. S. Nat. Mus., Wash. No. 43.

G. E. Dobson, *Catalogue of the Chiroptera in the British Museum*, 1878.

G. S. Miller, *Revision of North American Bats of the Family Vespertilionidae*, North American Fauna, 1897, No. 13.

The Order CHIROPTERA contains those mammals whose structure has been so modified as to permit of extended aerial progression. The fingers are greatly elongate, and between them is spread a delicate sensitive membrane, extending to the legs, and this constitutes the wing. The legs are weak, but the arms are greatly developed, while the chest muscles, lungs and heart are very capacious. The ribs are flat and placed close together. Bats are nearly helpless when upon the ground and the most skillful among them at terrestrial progression can only shuffle along, and they rarely alight upon the earth voluntarily. Odoriferous glands are found in many species, exuding a secretion that is very powerful and repelling, and which acts either as a means of protection against predatory animals, or to bring sexes together during the rutting season in the dark caves in which they usually take up their abode. In many species a membrane stretches between the hind limbs enclosing the tail, which enables the animals to move and turn with great rapidity, this broad, rudder-like contrivance acting as a lever in their flight. These bats are insectivorous, and belong to the Family VESPERTILIONIDÆ, and with them rapid movements are necessary to enable them to pursue successfully the flying insects upon which they live. Fruit-eating bats do not require this arrangement, as their food is stationary. Bats are divided into two groups, MEGACHIROPTERA and MICROCHIROPTERA, fruit-eating and insect-eating (sometimes blood-sucking) bats. With the first of these groups this work has nothing to do. In many bats, foliaceous cutaneous expansions exist about the nostrils, these often taking extraordinary shapes, and occasionally with erect portions of considerable height and width. These are known as "nose-leaf" bats, and their physiognomy is the most outré and bizarre of all the members of this Order. These apparently eccentric and useless structures are, on the contrary, of considerable importance to their possessors, for they are exceedingly sensitive and act

as a superior organ of touch, notifying their owner by the vibration of the waves of air, of the approach of any object. Bats are sociable and gregarious, and frequently many hundreds are found hanging in clusters from the roof of some cave or other hidden retreat. Unless it is the rutting season, these will be found to be all of one sex; for males and females do not keep together as a rule unless during the breeding period.

Insect-eating bats are divided into numerous families and genera. Of the former, the VESPERTILIONIDÆ contains the most species, none of which possess the nose-leaf. This family is usually divided into five groups named respectively the PLEOTINE, ANTROZOINE, VESPERTILIONINE, MINIOPTERINE, and THYROPTERINE, the last two of which have no members within the limits of the territory covered by the present work, as the MINIOPTERINE belong to the eastern Hemisphere and the THYROPTERINE to Brazil and the island of Madagascar.

Fam. I. **Vespertilionidæ. Common Bats.**

"Bats with turbinal bones folded; bony palate defective anteriorly owing to the absence of palatal processes to the premaxillæ; molars with promiscuous W-shaped cusps; tail included nearly to tip in large interfemoral membrane; muzzle and nostrils variable, but former never provided with distinct nose-leaf." (Miller.)

The first subfamily, the VESPERTILIONINE division of the bats, contains the vast majority of the species known to belong to the family. They are generally of small size, with inconspicuous ears, and have simple nostrils entirely without any indication of a nose-leaf. They are the common bats of the New World.

Subfam. I. **Vespertilioninæ.**

114. **Myotis. Slender, Long-tailed Bats.**

$$I. \frac{2}{3} \frac{2}{3}; C. \frac{1}{1} \frac{1}{1}; P. \frac{3}{3} \frac{3}{3}; M. \frac{3}{3} \frac{3}{3} = 38.$$

Myotis Kaup, Skizzirte Entw.-Gesch. u. Naturl. Syst. d. Europ. Thierw., I, 1829, p. 106. Type *V. murinus* Schreber = *Vespertilio myotis* Bechstein.

Nystactes Kaup, Skizzirte Entw.-Gesch. u. Naturl. Syst. d. Europ. Thierw., I, 1829, p. 108.

Vespertilio Keyserl & Blas., (nec Linn.), Wiegman, Archiv. f. Naturg., 1839, p. 306.

Selysius Bonp., Icon. Faun. Ital., 1841, Introd., p. 3.

Brachyotus Kolen., Allgem. Deutsch. Naturg. Zeitg. Dresden, neue Folge, II, 1856, pp. 131-174.

Isotus Kolen., Allgem. Deutsch. Naturg. Zeitg. Dresden, neue Folge, II, 1856, pp. 131, 174-177.

Acroestes Fitzing., Sitzungber. Math. Nat. Cl. K. Akad. Wiss. Wien, LXII, 1870, abth. I, p. 427.

Comastes Fitzing., Sitzungber. Math. Nat. Cl. K. Akad. Wiss. Wien, LXII, 1870, abth. I, p. 565.

Form slender; tail long; face hairy; ears narrow; tragus, tapering, straight, or recurved; dental formula characteristic.

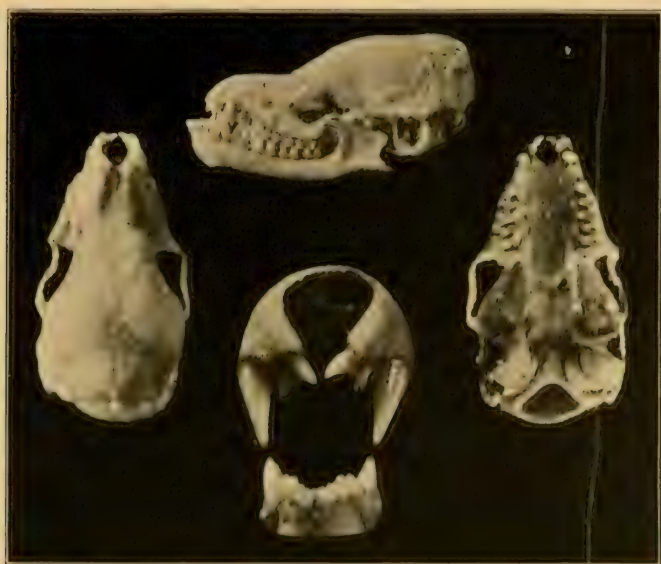


FIG. 107. MYOTIS NIGRICANS.

No. 105644 Coll. U. S. Nat. Mus.

Skull enlarged 3 times. Nose view enlarged 9 times.

KEY TO THE SPECIES AND SUBSPECIES.

- | | | | |
|------|--|------------------------|-----|
| A. | Free border of uropatagium conspicuously fringed | <i>M. thysanodes</i> | 572 |
| B. | Free border of uropatagium not conspicuously fringed. | | |
| a. | Forearm more than 40 mm. | | |
| a.' | Ear over 15 mm. | <i>M. velifer</i> | 573 |
| b. | Forearm not less than 33 or more than 40 mm. | | |
| a.' | Ear from meatus over 15 m. | | |
| a.{' | Back hair brown, belly isabella. . . . | <i>M. peninsularis</i> | 573 |

		PAGE
b."	General color yellowish brown.....	<i>M. evotis</i> 574
c."	Upper parts brown, flanks ashy.....	<i>M. vivesi</i> 574
d."	Upper parts pinkish buff.....	<i>M. milleri</i> 575
e."	Back above brown, belly pale broccoli brown; size, medium large.....	<i>M. nigricans</i> 575
f."	Back very dark brown; size, very small.....	<i>M. chiriquensis</i> 576
g."	Back Prout's brown, belly burnt umber.....	<i>M. dominicensis</i> 576
h."	General color pale wood brown.....	<i>M. yumanensis</i> 576
i."	Back dark yellowish brown, belly isabella.....	<i>M. y. saturatus</i> 577
c.	Forearm not over 36 mm.	
a.'	Tibia 15 mm. or under.	
a."	Above dark wood brown.....	<i>M. orinomus</i> 577
b."	General hue yellowish brown.....	<i>M. californicus</i> 578
c."	General hue brown, belly gray.....	<i>M. c. jaliscensis</i> 579
d."	Back yellowish brown, belly paler.....	<i>M. c. mexicanus</i> 579
e."	Above light ochraceous buff, or brownish cream buff.....	<i>M. c. pallidus</i> 579
f."	Above pale fawn brown.....	<i>M. c. durangæ</i> 579
b.'	Tibia over 15 mm.	
a."	General color light brown; ear slender.....	<i>M. subulatus</i> 580
b."	Back dull brown, belly yellowish; ear broad.	
a.""	Forearm 36-38 mm.....	<i>M. lucifugus</i> 580
b.""	Forearm 38-40 mm.....	<i>M. l. longicrus</i> 581

539. thysanodes (*Myotis*), Miller, N. Am. Faun., No. 13, 1897, p. 80. Elliot, Syn. N. Am. Mamm., 1901, p. 406.

albescens evotis and *albescens velifer*, H. Allen, Mon. N. A. Bats, 1893, pp. 90, 93.

FRINGED BAT.

Type locality. Old Fort Tejon, in mountains south of Kern Lake, Kern County, California.

Geogr. Distr. State of Michoacan, Mexico, north to Southern California.

Genl. Char. Size large. Calcar thick and distinct, usually terminating in a well-marked pointed projection; free border of uropatagium thickened and densely haired; ears moderately long; laid forward they reach 3 to 5 mm. beyond nostrils; wings from point between ankle and base of toes, but nearer latter.

Color. Everywhere light dull yellowish brown, distinctly paler

ventrally, the hairs everywhere dusky slate at base. The palest specimens are yellowish wood brown inclining to clay color; the darkest specimens dull raw umber. The belly varies from clear gray scarcely tinged with yellow to a strong yellowish gray, and in other specimens to dull brownish gray. (Miller, l. c.)

Measurements. Average of 11 specimens from Old Fort Tejon gives total length, 85-95; tail vertebræ, 36-37; tibia, 16.4-18; foot, 8-8.9; forearm, 40-46; thumb, 6-6.7; longest finger, 69-73.6; ear from meatus, 17.6-18.5; width of ear, 11.8-12.2; tragus, 10.5-11. (Miller.) Skull: greatest length, 16.5; occipito-nasal length, 14.5; zygomatic width, 8.5; breadth of braincase, 7.6; greatest width of rostrum, 5.5; length of mandible, 11.5; length of upper molar series, 4.5; of lower molar series, 5.5.

540. *velifer (*Vespertilio*), J. A. Allen, Bull. Am. Mus. Nat. Hist., 1890, p. 177. Elliot, Syn. N. Am. Mamm., 1901, p. 401.

LARGE-WINGED BAT.

Type locality. Santa Cruz del Valle, near Guadalajara, State of Jalisco, Mexico.

Geogr. Distr. From State of Mexico north throughout Mexico to Missouri.

Genl. Char. Size large; calcar slender, lobe not well developed; free border of uropatagium naked; ears short, reaching tip of nose; wings from metatarsus. Skull: strong and heavily built, but not larger than *M. thysanodes*; greatest length, 16-16.4; zygomatic breadth, 10-11; interorbital constriction, 4-4.2; width of rostrum at anterior root of first upper molar, 6-6.2; length of mandible, 12-13.

Color. Fur is dull sepia throughout, paler on the belly, dusky slate at base; belly usually dull broccoli brown, sometimes mixed with yellow, and then is a nearly isabella color.

Measurements. Total length, 99-105; tail, 44.8; tibia, 18.5; foot, 9.5; forearm, 40-47; thumb, 7.2; longest finger, 73.4; ear from meatus, 16; width of ear, 10.6; tragus, 9. (Miller, N. Am. Faun., No. 13.) Skull: total length, 16; basilar length, 14; greatest width, 10.5; length of mandible, border of incisors to condyle, 13.

541. peninsularis (*Myotis*), Miller, Ann. Mag. Nat. Hist., 7th Ser., 11, 1898, p. 124.

LOWER CALIFORNIA BAT.

Type locality. San José del Cabo, Lower California, Mexico.

**V. albescentis*, Auct., has been attributed to *M. velifer*, but the real *albescentis*. Geoff., Ann. Mus. Hist. Nat., VIII, 1805, p. 204, is a South American Bat, and does not pass north of the Isthmus of Panama.

Geogr. Distr. Cape Region of Lower California, Mexico.

Genl. Char. Skull and teeth are those of *M. velifer*; tail short.

Color. There are two phases of coloration: one is a general hue of wood brown, lower parts paler; the other is hair brown, lower parts isabella color.

Measurements. Total length, 91; tail, 34; forearm, 39; longest finger, metacarpal, 61; tibia, 14.6; foot, 10; ear from meatus, 15. Skull: greatest length, 15; zygomatic breadth, 10; interorbital constriction, 3.8; width of rostrum at anterior root of first molar, 6; length of mandible, 11.8; length of upper molar series, 6.4; of lower molar series, 8.

542. *evotis* (*Vespertilio*), H. Allen, Mon. N. Amer. Bats, 1864, p. 48.

Elliot, Syn. N. Am. Mamm., 1901, p. 406.

chrysonotis J. A. Allen, Bull. Am. Mus. Nat. Hist., 1896, p. 240.

PROMINENT-EARED BAT.

Type locality. Not given; possibly Monterey, Monterey County, California.

Geogr. Distr. State of Vera Cruz, Mexico, north and west to Pacific coast of the United States.

Genl. Char. Size large; calcar longer than free border of uropatagium, and a lobule at tip; ears reaching beyond tip of nose; wing membrane from base of foot.

Color. Light yellowish brown, hairs dusky slate at base; ventral surface paler. Color among individuals varies considerably.

Measurements. Total length, 85-92; tail vertebrae, 41-43; tibia, 17.6-20; foot, 7-9; thumb, 6-8; forearm, 36.6-40.4; longest finger, 62-67; ear from meatus, 19.4-23; width of ear, 11.8-14.6; tragus, 10.8-13.

543. *vivesi* (*Myotis*), Menegaux, Bull. Mus. Hist. Nat., Paris, 1901, p. 323.

CARDONAL ISLAND BAT.

Type locality. Cardonal Island, Archipelago of Salsi Puedes, off east coast of Lower California, Mexico.

Genl. Char. Ears very long, reaching beyond nostrils by 5 mm.; feet large, with large sharp claws; calcaneum without lobe. Skull has the braincase subcircular; occiput elevated.

Color. Upper parts brown; flanks ashy; under parts whitish; wing membranes blackish brown.

Measurements. Total length, 138-142; tail, 70; tibia, 25; foot with claws, 22; calcaneum, 22; forearm, 59-60; thumb with nail, 9; third finger, 118-120; ear from base of tragus, 23; tragus, 12.

544. milleri (*Myotis*), Elliot, Pub. Field Columb. Mus., III, 1903, p. 172. Zoölogy.

MILLER'S BAT.

Type locality. La Grulla, San Pedro Martir Mountains, Lower California, Mexico. Altitude 8,000 feet.

Genl. Char. Fur long; calcar like that of *M. evotis*; ears very large, pointed at tip; wings from base of foot; color very pale. Skull with forehead rising gradually from rostrum; occiput rounded; rostrum broad; no occipital crest.

Color. Upper parts broccoli brown, with a tinge of russet; under parts whitish or creamy white, the base of all the body hairs being blackish; ears black with a purple shade; sides of face pale brown; wings and interfemoral membrane purplish black; feet black.

Measurements. Total length, 87; tail vertebræ, 43; tibia, 21; foot, 9; ear from meatus, 19; width of ear, 10.5; tragus, 9; forearm, 32; thumb, 5.2; longest finger, first phalanx, 27; second phalanx, 12; third phalanx, 10; fourth phalanx, 6. Skull: occipito-nasal length, 14; Hensel, 11; zygomatic width, 8; interorbital constriction, 4; width of rostrum, 5; width of braincase, 6.5; palatal length, 6; length of upper tooth row, alveolar border, 4.



FIG. LXXXV. MYOTIS NIGRICANS.

No. 105644 U. S. Nat. Mus. Coll. 34 times nat. size.

545. nigricans (*Vespertilio*), Max., Beitr. Natur. Bras., II, 1826, p. 266.

?*concinna* H. Allen, Proc. Acad. Nat. Scien. Phil., 1866, p. 280.

GRIZZLED BROWN BAT.

Type locality. Fazenda de Aga, near the Iritiba River, south-eastern Brazil.

Geogr. Distr. Tres Marias Islands, State of Jalisco, Mexico, south to Columbia and Brazil, West Indies.

Genl. Char. Similar to *M. californicus*; foot larger, ear smaller.

Color. Above clove brown; beneath light broccoli brown.

Measurements. Total length, 68.5; tail vertebræ, 38.1; tibia, 13.9; foot, 7.1; forearm, 34.2; thumb, 5; longest finger, 58.5; ear from meatus, 13.9; width of ear, 8.6; tragus, 7.6. Skull: occipito-nasal length, 11; zygomatic width, 5; width of braincase, 6; width of rostrum, 3.5; interorbital constriction, 3; length of mandible, 9; length of upper molar series, 3.5; of lower molar series, 4.

546. chiriquensis (*Myotis*), Allen, Bull. Am. Mus. Nat. Hist., 1904, p. 77.

CHIRIQUEI BAT.

Type locality. Boqueron, Chiriqui, Panama.

Genl. Char. Size very small; pelage thick, soft, short; wing from base of toes; uropatagium naked above, slightly hairy at extreme base below; ears medium, rather pointed, deeply incised on outer border.

Color. Above very dark brown, paler beneath; basal two-thirds of face plumbeous; beneath surface blackish; ears and membrane dark brown.

Measurements. Total length, 73; tail vertebræ, 30; tibia, 11.5; foot, 6.5; forearm, 26; thumb, 4; third finger, metacarpal, 31; ear from meatus, 10; tragus, 5. Skull: total length, 13.6; mastoid breadth, 6.5.

547. dominicensis (*Myotis*), Miller, Proc. Biol. Soc. Wash., xv, 1902, p. 243.

DOMINICAN COMMON BAT.

Type locality. Island of Dominica.

Genl. Char. Similar to *M. nigricans*, but smaller; facial line of skull more abruptly elevated above level of rostrum.

Color. Above uniform Prout's brown; beneath tinged with burnt umber; hairs on back blackish at base; those of under parts slaty black on proximal half. (Alcoholic specimen.)

Measurements. Total length, 63; tail vertebræ, 27; tibia, 12.4; foot, 7; forearm, 32.4; first digit, 6.4; second digit, 28; third digit, 48; fourth digit, 4; fifth digit, 37; ear from meatus, 11; from crown, 8; width of ear, 6. Skull: greatest length, 12.4; basal length, 11.2; basilar length, 9.4; zygomatic breadth, 7.2; interorbital constriction, 3; mandible, 8.8; maxillary tooth row, exclusive of incisors, 5; mandibular tooth row, 5. (Miller, l. c.)

548. yumanensis (*Vespertilio*), H. Allen, Mon. N. Am. Bats, 1864, p. 58. Elliot, Syn. N. Am. Mamm., 1901, p. 403.

FORT YUMA BAT.

Type locality. Old Fort Yuma, San Diego County, California.

Geogr. Distr. State of San Luis Potosi, Mexico, into southwestern United States.

Genl. Char. Size small; calcar distinct, considerably longer than free border of interfemoral membrane, terminating in a well-marked lobule; free border of uropatagium naked; ears moderate; wings from base of toes, but on account of extent of web between toes apparently from side of metatarsus; feet very large and strong as compared with other small American species. (Miller.)

Color. Above pale wood brown, beneath dirty whitish; fur light plumbeous at base; ears and membranes light brown; white edges on wings and uropatagium.

Measurements. Total length, 70.2-83.7; tail vertebræ, 34.9-36.7; tibia, 14.1-15.7; foot, 7.9-8.8; forearm, 33.9-34.4; thumb, 5.2-6.5; longest finger, 55.5-57.8; ear from meatus, 14-14.4; width of ear, 8.2-9.1; tragus, 7-7.6.

a.—saturatus (*Myotis*), Miller, N. Am. Faun., No. 13, 1897, p. 68.

Elliot, Syn. N. Am. Mamm., 1901, p. 403.

DARK YUMA BAT.

Type locality. Hamilton, Skagit County, Washington.

Geogr. Distr. State of Michoacan, Mexico, north to Oregon, Washington, and British Columbia.

Genl. Char. Similar to *M. yumanensis*, but darker.

Color. Above dark yellowish brown; belly isabella color; chin, throat, and sides darker than belly; fur everywhere deep blackish plumbeous at base; ears and membranes blackish.

Measurements. Total length, 77-82.3; tail vertebræ, 30-36.5; tibia, 14-15; foot, 8.3-8.6; forearm, 33-35.3; longest finger, 57-59.3; ear from meatus, 14.3; width of ear, 8.9; tragus, 7. Skull: occipito-nasal length, 12; total length, 13; Hensel, 10; zygomatic width, 7.5; interorbital constriction, 4.5; palatal length, 6.5; length of upper molar series, 3; length of mandible, angle to symphysis, 9; length of lower molar series, 4.5.

549. orinomus (*Myotis*), Elliot, Pub. Field Columb. Mus., III, 1903, p. 228.

LA GRULLA BROWN BAT.

Type locality. La Grulla, San Pedro Martir Mountains; 8,000 feet elevation.

Genl. Char. Similar to *M. californicus*, but larger; color paler; ear larger. Skull larger; braincase flatter, less elevated above ros-

trum; interorbital constriction greater; rostrum longer; palate narrower; molars larger; coronoid process much higher above angle of mandible; tragus long, slender, pointed.

Color. Above dark wood brown, beneath very pale broccoli brown; ears, feet, and membranes black.

Measurements. Total length, 88; tail, 40; foot, 7; ear, 14; width of ear, 10 (Collr. Measrts.); forearm—? bones of both arms incomplete; longest finger, 60; thumb and claw, 5; tibia, 15; tragus, 7 (dried skin). Skull: occipito-nasal length, 13; Hensel, 11; zygomatic width, 8.5; width of braincase, 7; height of braincase at bullæ, 4.5; length of rostrum, 6; palatal length, 6; width across middle molar from outer edge, 5; length of upper molar series, 3.5; length of mandible, 9.5; height at coronoid process from angle, 4.5; length of lower molar series, 3.5.

550. californicus (*Vespertilio*), Aud. & Bach., Journ. Acad. Nat. Scien. Phil., 1842, p. 285. Elliot, Syn. N. Am. Mamm., 1901, p. 403.

nitidus H. Allen, Proc. Acad. Nat. Scien. Phil., 1862, p. 247.

oregonensis H. Allen, Mon. N. Am. Bats, 1864, p. 61.

obscurus H. Allen, Proc. Acad. Nat. Scien. Phil., 1866, p. 281.

volans H. Allen, Proc. Acad. Nat. Scien. Phil., 1866, p. 282.

exilis H. Allen, Proc. Acad. Nat. Scien. Phil., 1866, p. 283.

tenuidorsalis H. Allen, Proc. Acad. Nat. Scien. Phil., 1866, p. 283.

yumanensis H. Allen (nec H. Allen, 1864), Proc. Acad. Nat. Scien. Phil., 1866, p. 283.

melanorhinus Merriam, N. Am. Faun., No. 3, 1890, p. 46.

henshawi H. Allen, Mon. N. Am. Bats, 1893, p. 103.

nigricans H. Allen (nec Max.), Mon. N. Am. Bats, 1893, p. 97. (note.)

LITTLE CALIFORNIA BAT.

Type locality. California.

Geogr. Distr. Lower California and State of Chihuahua, Mexico, Texas, and Wyoming.

Genl. Char. Size very small. Calcar very slender, lobule at tip equal to free border of uropatagium, which is naked; ears reaching beyond end of nose; wings from base of toes. Skull: superior outline sloping gradually anteriorly to nasals; teeth feeble.

Color. Above yellowish brown, beneath paler; fur plumbeous at base.

Measurements. Total length, 77.8–82; tail vertebræ, 38.8–39; tibia, 13.9–14.4; foot, 5.4–6; forearm, 31–32; thumb, 4–4.2; longest finger, 55.4–58; ear from meatus, 12.9–14.2; width of ear, 9.9–10;

tragus, 7.5-8.3. Skull: occipito-nasal length, 12; Hensel, 11; zygomatic width, 8; interorbital constriction, 4; length of upper molar series, 4; length of mandible, angle to symphysis, 10; length of lower molar series, 5.

a.—jaliscoensis (*Myotis*), Menegaux, Bull. Mus. Hist. Nat., Paris, 1901, p. 321.

JALISCO BROWN BAT.

Type locality. Vicinity of Lake Zacoalco, State of Jalisco, Mexico.

Genl. Char. Larger than *M. californicus*, with longer forearm and third finger.

Color. Upper parts brown, becoming grayish on the belly, and red near anal region.

Measurements. Total length, 82; tail, 32-35; tibia, 16-17; foot, 7; forearm, 42; third finger, 71; thumb, 5; ear, 12-14; width of ear, 9; tragus, 7.8. Skull: total length, 16; length of braincase, 9; width 7; interorbital constriction, 3.5.

b.—mexicanus (*Vespertilio*), Sauss., Rev. Mag. Zoöl., 2me Sér., XII, 1860, p. 282.

LITTLE MEXICAN BAT.

Type locality. Unknown.

Geogr. Distr. States of San Luis Potosi, Michoacan, and Oaxaca, Mexico; range unknown.

Genl. Char. Larger and darker than *M. californicus*.

Color. Above yellowish brown, paler beneath.

Measurements. Total length, 81.5; tail vertebræ, 38; tibia, 14.2; foot, 5.9; forearm, 34.1; thumb, 4.4; longest finger, 60; ear from meatus, 14; width of ear, 9.6; tragus, 7.2.

c.—pallidus (*Myotis*), Stephens, Proc. Biol. Soc. Wash., XIII, 1900, p. 153. Elliot, Syn. N. Am. Mamm., 1901, p. 405.

PALE BAT.

Type locality. Vallecito, San Diego County, California.

Geogr. Distr. Lower California, Mexico, into southern California.

Genl. Char. "Size small, wings short, wing membrane thin and light; ears small; general appearance delicate."

Color. "Light ochraceous buff or brownish cream buff; below dull white; basal part of pelage above and below blackish."

Measurements. "Total length, 80; expanse, 208; tail vertebræ, 42; ear, 11; thumb, 4; forearm, 30; tibia, 15." (Stephens, l. c.)

d.—durangae (*Myotis*), Allen, Bull. Am. Mus. Nat. Hist., 1903, p. 612.

DURANGO BROWN BAT.

Type locality. Rio Sestin, State of Durango, Mexico.

Genl. Char. Size similar to that of *M. c. ciliolabrum*, color different.

Color. Upper parts pale fawn brown; under parts grayish white; fur at base dark plumbeous; ear brownish black; muzzle blackish.

Measurements. Total length, 76; tail vertebræ, 33; forearm, 33; longest finger, 54; tibia, 15; foot, 7; ear from meatus, 13.5.

- 551. subulatus** (*Vespertilio*), Say, Long's Exped. Rocky Mts., II, 1823, p. 65 (foot-note). Elliot, Syn. N. Am. Mamm., 1901, p. 405.

SMALL-WINGED BAT.

Type locality. Arkansas River, near La Junta, Otero County, Colorado.

Geogr. Distr. State of Sonora, Mexico, into North America east of Rocky Mountains.

Genl. Char. Size medium; calcar slender, a little longer than the border of uropatagium, with a lobule at the end; ears long, reaching beyond tip of nose; wings from base of toes; teeth and skull like those of *M. evotis*.

Color. Apparently not distinguishable from *M. lucifugus* in its general coloration; the differences being that this form has a "narrower skull, longer ears, and a more sharply pointed tragus."

Measurements. Total length, 80-85.6; tail vertebræ, 36.8-38.8; tibia, 16.4-17.2; foot, 7.5-8; forearm, 33.8-35.7; thumb, 6.2-6.5; longest finger, 58-61; ear from meatus, 15.6-16.7; width of ear, 9.8-10.7; tragus, 9-9.7. Skull: occipito-nasal length, 12; Hensel, 12; zygomatic width, 9; palatal length, 6.5; interorbital constriction, 3.5; length of upper molar series, 3; length of mandible, angle to symphysis, 10; length of lower molar series, 4.

- 552. lucifugus** (*Vespertilio*), Le Conte, McMurtrie, Cuv., Anim. King., 1, App., 1831, p. 431. Elliot, Syn. N. Am. Mamm., 1901, p. 402.

subulatus Le Conte, Proc. Acad. Nat. Scien. Phil., 1854-55, p. 435.

affinis H. Allen, Mon. N. Am. Bats, 1864, p. 53.

carolii Dobson, Cat. Chirop. Brit. Mus., 1878, p. 325.

austroriparius Rhoads, Proc. Acad. Nat. Scien. Phil., 1897, p. 227.

LITTLE BROWN BAT.

Type locality. Near Riceboro, southern portion of Liberty County, Georgia.

Geogr. Distr. Hudson Bay to Brazil. West Indies.

Genl. Char. Calcar slender, in length equal to free border of

uropatagium, which is naked; upper incisors bilobate; nose sub-bilobate; face with a naked prominence on both sides; ears short, pointed; tragus sublinear, anterior border straight; tail projecting a little beyond membrane; wings attached at the base of toes. Skull: nasals and palate broad; forehead sloping; braincase broad posteriorly, contracted anteriorly, outline slightly wedge shaped.

Measurements. Total length, 83.5-89.5; tail vertebræ, 37.6-40; tibia, 15.5-16.1; foot, 7.3-9.1; forearm, 36.1-38.9; thumb, 5.6-6.7; longest finger, 60.2-63.7; ear from meatus, 12.2-13.7; width of ear, 9.1-9.7; tragus, 7.1-8. Skull: occipito-nasal length, 13; total length, 14; Hensel, 10; zygomatic width, 8; interorbital constriction, 3.2; palatal length, 6; length of upper molar series, 4; length of mandible, angle to symphysis, 10; length of lower molar series, 4.

a.—longicrus True, Science, VIII, 1886, p. 588. Elliot, Syn. N. Am. Mamm., 1901, p. 402.

albescens H. Allen, Mon. N. Am. Bats, 1893, p. 92.

TRUE'S BAT.

Type locality. Puget Sound, Washington.

Geogr. Distr. Puget Sound east to Wyoming, south to southern California and Arizona, into Lower California and northern Mexico.

Genl. Char. Similar to *M. lucifugus*, but larger.

Color. No appreciable difference in the color of this form and *M. lucifugus*.

Measurements. Total length, 93.5-102; tail vertebræ, 41-46; tibia, 17.3-19.6; foot, 7.4-8.4; forearm, 38-40; thumb, 5.5-7; longest finger, 65-71; ear from meatus, 12-13.5; width of ear, 9-10; tragus, 7-8.2.

PIPISTRELLUS comprises a number of very small bats with a rather peculiar dental formula for this family, viz., four upper incisors and four lower premolars, although in other families the same formula exists, as is witnessed in the members of the genus *Noctilio* of the *Noctilionidæ*.

115. Pipistrellus.

$$I. \frac{2-2}{3-3}; C. \frac{1-1}{1-1}; P. \frac{2-2}{2-2}; M. \frac{3-3}{3-3} = 34.$$

Pipistrellus Kaup, Skizzirte Entwick.-Gesch. u. Naturl. Syst. d. Europ. Thierw., Th. 1, 1829, p. 98. Type *Vespertilio pipistrellus* Schreber.

Hypsugo Kolenati, Allgem. Deutsch. Naturhist. Zeitg., Dresden, neue Folge, II, 1856, pp. 131, 167-169.

Nannugo Kolenati, Allgem. Deutsch. Naturhist. Zeitg., Dresden, neue Folge, II, 1856, pp. 131, 169-172.

Size small; skull delicate; braincase inflated; rostrum broad; ears longer than broad, tapering, tip rounded; tragus straight or curving forward; basal third of the back of interfemoral membrane hairy.



FIG. 108. *PIPISTRELLUS HESPERUS*.

No. 35739 U. S. Nat. Mus. Coll.

2½ times nat. size. Face enlarged 7 times.

KEY TO THE SPECIES AND SUBSPECIES.

- | | |
|--|----------------------------|
| A. Tragus curved forward. | |
| a. General hue light yellowish gray; longest finger, 48-55.5 mm..... | <i>P. hesperus</i> 582 |
| b. General hue wood brown, longest finger, 47 mm..... | <i>P. h. apus</i> 583 |
| c. General hue darker and browner; longest finger, 45-47 mm..... | <i>P. h. australis</i> 584 |
| B. Tragus straight. | |
| a. Back clove brown tinged with rusty, belly smoky gray..... | <i>P. veræcrucis</i> 584 |
| b. Above reddish brown, beneath paler..... | <i>P. vagans</i> 584 |
| c. Upper and lower parts cinnamon..... | <i>P. cinnamomeus</i> 585 |

- 553. *hesperus*** (*Scotophilus*), H. Allen, Mon. N. Am. Bats, 1864, p. 43.
hesperus (*Pipistrellus*), Elliot, Syn. N. Am. Mamm., 1901, p. 409.
merriami Dobson, Cat. Chiropt. Brit. Mus., 1878, p. 228.

WESTERN BAT.

Type locality. Old Fort Yuma, San Diego County, California.

Geogr. Distr. Lower California, Mexico, to western Texas.

Genl. Char. Size small; ear reaching to nostril, short and rounded at tip; tragus curved forward at tip; end of tail free of membrane.

Color. Light yellowish gray, hairs plumbeous at base; between fourth and fifth finger, the border of wing membrane is whitish; ears, face muzzle, and membranes black.



FIG. LXXXVI. *PIPISTRELLUS HESPERUS*.

No. 10851 Field Columbian Mus. Coll. Trifle more than twice nat. size.

Measurements. Total length, 72.8-79; tail vertebræ, 28-34.5; tibia, 11-12.8; foot, 5-6; forearm, 28-32.5; thumb, 4; longest finger, 48-55.5; ear from meatus, 10-12.4; width of ear, 8.6-9.6; tragus, 4.6-5.4. Skull: occipito-nasal length, 11; zygomatic width, 7; width of braincase, 6; occipital depth, 4.

a.—apus (Pipistrellus), Elliot, Pub. Field Columb. Mus., III, 1904, p. 269. Zoölogy.

SWIFT BAT.

Type locality. Providentia Mines, State of Sonora, Mexico.

Genl. Char. About the size of *P. hesperus*, but quite different in color, and with a larger foot. Larger than *P. h. australis*, the exact color of which is not known.

Color. Upper parts wood brown, base of fur blackish; under parts pinkish brown; nose, space before and around eyes, wing, and tail, membranes, feet, and ears black.

Measurements. Total length, 72; tail vertebræ, 31.7; foot, 6.3; forearm, 30.5; thumb, 4; longest finger, 47; ear from meatus, 10. Skull: occipito-nasal length, 10.5; zygomatic width, 8; interorbital constriction, 3; width of braincase, 6.5; palatal length, 5; post-palatal length, to anterior rim of foramen magnum, 4; length of upper tooth

row, premolars and molars, 3; length of mandible, 8.5; length of lower tooth row, premolar and molars, 3.

b.—australis (*Pipistrellus*), Miller, N. Am. Faun., No. 13, 1897, p. 90.

ALLIED BAT.

Type locality. Barrance Ibarra, State of Jalisco, Mexico.

Geogr. Distr. State of Jalisco, Mexico; type locality only.

Genl. Char. Smaller than *P. hesperus*; darker.

Color. Similar to *P. hesperus*, but apparently darker and browner. (Specimens in alcohol.)

Measurements. Total length, 63.2-64; tail vertebrae, 26.8-28; foot, 5; forearm, 28.6-29; thumb, 3.9-4; longest finger, 45-47; ear, 10.4-10.7; tragus, 4.5-5.

554. *veracrucis* (*Vesperugo*), Ward, Am. Nat., xxv, 1891, p. 745.

LAS VIGAS BAT.

Type locality. Las Vigas, Jalapa, State of Vera Cruz, Mexico.

Geogr. Distr. Known only from type locality.

Genl. Char. Similar to *P. subglavus*, but smaller, thumb longer; legs and arms naked; wing extending from base of outer toe; tragus tapering, straight.

Color. Above clove brown, tinged with rusty; beneath grayish, or smoky gray.

Measurements. "Total length, 73.5; tail, 36; ear from notch, 10; height of tragus, inner margin, 4.5; outer margin, 6; greatest width of tragus, 2; length of antitragus, 2; height, .75; forearm, 31; thumb and claw, 7.5; second digit, metacarpal, 29; third digit, metacarpal, 30.5; first phalanx, 11.5; second phalanx, 11; cartilaginous tip, 2.5; fifth digit, metacarpal, 28; first phalanx, 8.5; second phalanx, 5; cartilaginous tip, 1; interspace between tips of third and fourth digits, 16; interspace between tips of fourth and fifth digits, 37; interspace between tip of fifth digit and juncture of membrane with foot, 42; extent of outstretched wings, 212; length of tibia, 13.5; length of foot, 9; length of calcaneum, about 8." (Ward, l. c.)

555. *vagans* (*Vesperugo*), Dobson, Ann. Mag. Nat. Hist., 5th Ser., IV, 1879, p. 135.

WANDERING BERMUDA BAT.

Type locality. Bermuda.

Genl. Char. Ears short, triangular; tragus with lower two-thirds of outer margin straight; small lobe at base; upper margin rounded; last caudal vertebrae free; upper inner incisor long, unicuspidate; outer short, conical; lower incisors trifid; first upper premolar very small.

Color. Above reddish brown; beneath paler.

Measurements. Length of head and body, 50; tail, 45; forearm, 38.7; thumb, 7.5; tibia, 15; foot, 9.5; ear, 12.5; tragus, 5.

556. cinnamomeus (*Pipistrellus*), Miller, Proc. Acad. Nat. Scien. Phil., 1902, p. 390.

CINNAMON BAT.

Type locality. Montechristo, State of Tabasco, Mexico.

Genl. Char. Size large; skull long, narrow; color uniform; upper inner incisor smaller than outer; first and second upper molars with an indicated hypocone.

Color. Uniform cinnamon, slightly inclined to yellow on under parts; ears and membranes brown.

Measurements. Total length, 99; tail, 44; forearm, 37; thumb, 6.8; second finger, 35; third finger, 63; fourth finger, 53; fifth finger, 47; tibia, 15.4; foot, 9.6; ear from meatus, 11.4; from crown, 9; width of ear, 7. Skull: greatest length, 15; basal length, 14; basilar length, 11.6; palatal length, 6; width of palate between middle molars, 3; interorbital constriction, 4; zygomatic breadth, 9; width of braincase, above roots of zygomata, 7.2; length of mandible, 11.4; length of upper tooth row, 5.8.

VESPERTILIO as now restricted has comparatively few members, but among them are the largest species of the Vespertilionine group. In North America there are but three species of the genus, with several more or less closely connected races.

116. *Vespertilio.

$$I.\frac{2-2}{3-3}; C.\frac{1-1}{1-1}; P.\frac{1-1}{2-2}; M.\frac{3-3}{3-3} = 32.$$

Vespertilio Linn. Syst. Nat., 1, 1758, p. 31; 1, 1766, p. 46. Type

Vespertilio murinus Linnaeus. (nec Schreber.)

Eptesicus Rafin., Ann. Nat., 1, 1820, p. 2.

Cnephaeus Kaup, Skizzirte Entw.-Gesch. u. Naturl. Syst. Europ.

Thierw., 1, 1829, p. 103.

Noctula Bonp., Iconog. Faun. Ital., 1, 1837, fasc. xxi.

Vesperugo Keyserl. & Blas., Wiegmann, Archiv. f. Naturg., 1839,

Bd. 1, p. 312. (Part.)

*For reasons for adopting this term rather than *Eptesicus* Rafin., as advised by Mchely (Mon. Chirop. Hung. 1900, pp. 206-308), see Thomas, Ann. Mag. Nat. Hist., 7th Ser., VII, 1901, p. 462, and VIII, p. 32.

Vesperus Keyserl. & Blas., Wieg., Archiv. f. Naturg., 1839, Bd. 1, p. 313.

Catcorus Kolenati, Allgem. Deutsch. Naturh. Zeitg., Dresden, neue Folge, 11, 1856, pp. 121, 162.

Metcorus Kolenati, Allgem. Deutsch. Naturh. Zeitg., Dresden, neue Folge, 11, 1856, pp. 131, 167.

Marsipolæmus Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1872, p. 260.

Adclonycteris H. Allen, Proc. Acad. Nat. Scien. Phil., 1891, p. 466.

Skull large, superior outline nearly straight; occiput angular; sagittal crest present; rostrum broad, slightly concave back of nasal opening; ear short, narrower than long, with basal lobe; tragus straight, short, directed forward, pointed; back of interfemoral membrane with but few hairs.



FIG. 109. VESPERTILIO FUSCUS.

No. 61130 U. S. Nat. Mus. Coll.

2½ times nat. size. Nose enlarged 5 times.

KEY TO THE SPECIES AND SUBSPECIES.

- A. Outer margin of ear conch not terminating under the jaw.
 - a. Tragus short, less than half the length of the ear.

	PAGE
a.' Muzzle narrow.	
a." General color bistre or sepia..... <i>V. fuscus</i>	587
b." General color dark reddish brown.... <i>V. f. cubensis</i>	588
c." General color dark sepia..... <i>V. f. miradorensis</i>	588
d." Above dark brown..... <i>V. f. bahamensis</i>	588
e." General color pale brownish fawn... <i>V. f. peninsule</i>	589
f." Above pale bistre..... <i>V. f. bernardinus</i>	589
b.' Muzzle broad.	
a." General color rust red..... <i>V. f. propinquus</i>	589
b. Tragus long, narrow, equal to half the length of the ear..... <i>V. gaumeri</i>	590
B. Outer margin of ear conch terminating under the jaw..... <i>V. albicularis</i>	590



FIG. LXXXVII. VESPERTILIO FUSCUS.

No. 85101 U. S. Nat. Mus. Coll. Twice nat. size.

557. fuscus (*Vespertilio*), Beauvois, Cat. Peale's Mus. Phil., 1796,

p. 14. Elliot, N. Am. Mamm., 1901, p. 410.

carolinensis Geoff., Ann. Mus. Hist. Nat., 1806, p. 193.

phaiops Rafin., Am. Month. Mag., III, 1818, p. 445.

melanops Rafin., Ann. Nat., 1820, p. 2.

arquatus Say, Long's Exp. Rocky Mts., I, 1823, p. 167 (note).

ursinus Temm., Mon. Mamm., II, 1835, p. 235.

greenii Gray, List Spec. Mamm. Brit. Mus., I, 1843, p. 30.

BROWN BAT.

Type locality. Philadelphia, Pa.

Geogr. Distr. Lower California, Mexico, and "Austral, Transition, and (lower edge of) Boreal Zones throughout the eastern United States north of Florida and adjoining British provinces." (Miller.)

Genl. Char. Size large, ears short, membrane heavy, thick; foot half as long as tibia; wing membranes attached beyond base of toes, naked, save a few hairs on under side of interfemoral membrane and wings near humerus and forearm.

Color. Above bistre or sepia; paler beneath.

Measurements. Total length, 108.5-116; tail vertebrae, 42-47.5; tibia, 19.1-19.7; foot, 9.2-10.4; forearm, 44.8-47; thumb, 6-7; longest finger, 79.4-82; ear from meatus, 17-19.5; width of ear, 12.4-13.3; tragus, 7.8-8.3. Skull: occipito-nasal length, 12.5; zygomatic width, 12.5; length of mandible, 14.

a.—cubensis (*Scotophilus*), Gray, Ann. Nat. Hist., iv, 1839, p. 7.

dutertreus Gerv., in Ramon de la Sagra's Hist. l'Isle de Cuba,

Mamm., 1840, p. 6.

CUBAN BROWN BAT.

Type locality. Cuba.

Geogr. Distr. Island of Cuba.

Genl. Char. Ears and membranes thin; ears small, papery, narrow, pointed.

Color. Rich dark reddish brown above and beneath.

Measurements. Total length, 110.7; tail vertebrae, 48.5; forearm, 48.4; thumb, 6.6; longest finger, 86; tibia, 19.9; foot, 9; ear from meatus, 16.7; tragus, 8.4.

b.—miradorensis (*Scotophilus*), H. Allen, Proc. Acad. Nat. Scien.

Phil., 1866, p. 287.

MIRADOR BROWN BAT.

Type locality. Mirador, State of Vera Cruz, Mexico.

Geogr. Distr. Southern Mexico, into Guatemala and Costa Rica.

Genl. Char. Size large; color dark; ears and membranes rather thin.

Color. Similar to *V. fuscus*, but darker.

Measurements. Total length, 110-120; tail vertebrae, 48-57; forearm, 50-52; thumb, 6.4-7; longest finger, 85-93; tibia, 20-22; foot, 9.8-11.4; ear from meatus, 18.6-20; tragus, 8.3-10. Skull: occipito-nasal length, 19.5; zygomatic breadth, 13; length of mandible, 14.5. (Miller.)

c.—bahamensis (*Vespertilio*), Miller, N. Am. Faun., No. 13, 1897,

p. 101.

BAHAMIA BROWN BAT.

Type locality. Nassau, New Providence Island, Bahamas.

Geogr. Distr. Known only from type locality.

Genl. Char. Ears narrow; membranes thin; size small; muzzle narrow.

Color. Dark brown, darker than *V. fuscus*.

Measurements. Total length, 103; tail vertebrae, 44; forearm, 42; thumb, 6; longest finger, 77; tibia, 18; foot, 8; ear, 16.8; tragus, 7.6. Skull: occipito-nasal length, 16.5; zygomatic breadth, 11; length of mandible, 12.6; interorbital constriction, 4; width of braincase, 8.

d.—peninsulæ (*Vespertilio*), Thomas, Ann. Mag. Nat. Hist., 7th Ser., 1898, p. 43.

LOWER CALIFORNIA BROWN BAT.

Type locality. Sierra Laguna, Lower California, Mexico.

Geogr. Distr. Lower California, Mexico.

Genl. Char. Size small; color pale.

Color. General hue pale brownish fawn, darkest posteriorly; base of hairs slaty black.

Measurements. Total length, 95; tail vertebrae, 34; ear, 14. Skull: basal length, 14.2; occipito-gnathic length (to front of pre-maxillæ), 16.5; greatest breadth, 11.7; interorbital width, 6.3; front of canine to back of third upper molar, 6.2; intertemporal breadth, 3.8. (Thomas, l. c.)

e.—bernardinus (*Hespericus*), Rhoads, Proc. Acad. Nat. Scien. Phil., 1901, p. 619.

SAN BERNARDINO BAT.

Type locality. San Bernardino Valley, near San Bernardino, San Bernardino County, California.

Geogr. Distr. Southern California and San Pedro Martir Mountains, Lower California.

Genl. Char. Size and cranial characters as in *V. fuscus*.

Color. Above pale bistre; beneath brownish drab; hairs unicolor nearly to the roots; ear and wing membranes blackish.

Measurements. Total length, 114; tail, 42; extent of wing, 304; foot, 11.5; ear, 17. Skull: occipito-nasal length, 15.5; total length, 17.5; Hensel, 13.5; zygomatic width, 11.5; interorbital constriction, 4; height of braincase at audital bulke, 6.2; width of braincase, 8; palatal length, 7; length of upper molar series, 5; length of mandible, 13; height at coronoid process, 5; length of lower molar series, 6.

f.—propinquus (*Vesperugo*), Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1872, p. 262.

ALLIED BROWN BAT.

Type locality. Santa Isabel, Guatemala.

Geogr. Distr. Guatemala and Nicaragua, Central America.

Genl. Char. Size small, colors dark, muzzle broad.

Color. Similar to *V. f. miradorensis* (H. Allen), dark brown. Peters describes the type as rust red, probably changed by alcohol.

Measurements. Total length, 96-105; tail vertebrae, 37-45; forearm, 40; thumb, 5-9.5; longest finger, 68; tibia, 17-18; foot, 7.8-10; tragus, 6-7.8.

558. *gaumeri* (*Adclonycteris*), Allen, Bull. Am. Mus. Nat. Hist., 1897, p. 231.

YUCATAN BROWN BAT.

Type locality. Izamal, Yucatan, Mexico.

Geogr. Distr. Yucatan, Mexico.

Genl. Char. Similar to but smaller than *V. fuscus*; narrower and more tapering tragus, and smaller in size; ears thin.

Color. Above dark brown washed with olive; beneath buffy gray; ears and membranes black.

Measurements. Total length, 95; forearm, 39; thumb, 7; third finger, 79; tibia, 70; tail, 40; foot, 8; ear, 21. Skull; greatest length, 18; mastoid breadth, 8.3; zygomatic breadth, 10.1; interorbital breadth, 4; length of tooth row, 4.2; palatal length, 5.3.

A. *Marsipolaemus*.

Characters as given below for the species.

559. **albigularis* (*Vesperus*), Peters, Monatsb. K. Preuss, Akad. Wiss. Berlin, 1872, p. 260.

WHITE-THROATED BROWN BAT.

Type locality. Mexico?

Geogr. Distr. Unknown.

Genl. Char. Lower half of outer margin of the ear conch broadly folded backward, separated in front from the angle of the mouth by a wart, but terminating below and internal to it under the lower jaw by a small internal projection. Ears very broad and broadly rounded off above; tragus broad above, attaining its greatest width above the middle of the inner margin, which is slightly concave, narrowest opposite the base of the inner margin; a prominent triangular lobe at the base of the outer margin. Nostrils rather wide apart, opening sublaterally; muzzle broad and obtuse; crown of the head scarcely elevated above the face line. Wings from the base of the toes; postcalcaneal lobe long and narrow; last caudal vertebra free. Upper inner incisors long and broad and slightly bifid at their extremities; outer incisor very short, scarcely exceeding the cingulum of the

*Possibly not Mexican.

inner one in vertical extent; the single upper premolar close to the canine; lower incisors in the direction of the jaws; first lower premolar half the size of the second, which exceeds the molars in vertical extent. (Dobson.)

Color. Above dark brown, the extreme tips of fur hoary, as in *V. noctivagans*; paler beneath; the *chin and throat* as far back as a line connecting the posterior margin of the ears, *pure white*.

Measurements. Total length, 86.36; tail, 38.10; head, 17.78; ear, 16; forearm, 41.91; thumb, 8.89; third finger, 69.85; fifth finger, 50.80; tibia, 15.24; foot, 8.89. (Dobson.)

The bats of the genus *LASIURUS* are chiefly recognizable by their rather heavily furred interfemoral membrane. They are of moderate size and the genus consists in North America of two species, one of which is split up into several races.

117. *Lasiurus*.

$$I. \frac{1-1}{3-3}; C. \frac{1-1}{1-1}; P. \frac{2-2}{2-2}; M. \frac{3-3}{3-3} = 32.$$

Lasiurus Gray, Zoöl. Misc., 1831, No. 1, p. 38. Type *Vespertilio borealis* Müller.

Atalapha Peters, Monatsb. K. Preuss. Akad. Wiss. Berlin, 1870, p. 907. (nec Rafin.)

Small premolar at base of upper incisor on inner side; incisor in contact with canine; ear broad, rounded at tip, hairy; back of interfemoral membrane thickly furred; skull broad.

KEY TO THE SPECIES AND SUBSPECIES.

A. Upper part of interfemoral membrane hairy.

a. Size small; forearm hairy, but without hairy tuft near elbow.

a.' Ears large.

a." Color variable, yellowish red to yellowish gray. *L. borealis* 592

b." General hue deep cherry red. *L. b. Pfeifferi* 593

b.' Ears small.

a." Back of interfemoral membrane hairy. *L. b. teliotis* 593

b." Back of interfemoral membrane nearly naked. *L. b. mexicanus* 594

- b. Size large; forearm with hairy tuft near elbow.....*L. cinereus* PAGE 595

560. **borealis** (*Vesperilio*), Müll., Natursys., Suppl., 1776, p. 21.
noveboracensis Erxl., Syst. Regn. Anim., I, 1777, p. 155.
lasiurus Schreb., Säugeth, Abth., I, 1781, Taf. LXII B.

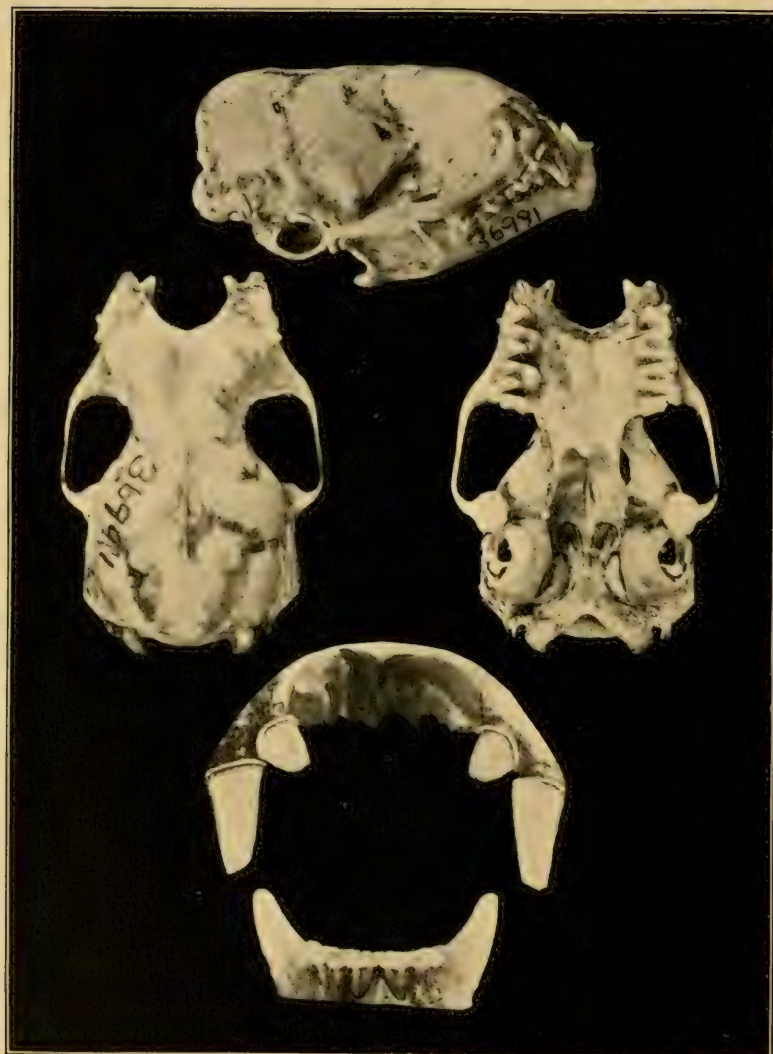


FIG. 110. LASIURUS CINEREUS.

No. 36991 U. S. Nat. Mus. Coll.

Enlarged 3 times. Incisors enlarged 6 times

noveboracus Bodd., Elench. Anim., 1, 1785, p. 71.

rubellus Beauv., Cat. Peale's Mus., 1796, p. 204.

rubra Ord, Guthr., Geog., 2d. Amer. ed., 11, 1815, p. 291.

tesselatus Rafin., Am. Month. Mag., 111, 1818, p. 445.

monachus Rafin., Am. Month. Mag., 111, 1818, p. 445.

rufus Warden, Desc. États Unis. Am., v, 1820, p. 606.

funebis Fitzin. Sitzungb. K. Akad. Wiss. Wein, LXII, 1870, p. 46.

borealis (*Lasiurus*), Elliot, Syn. N. Am. Mamm., 1901, p. 411.

RED BAT.

Type locality. State of New York.

Geogr. Distr. North America through Mexico to Panama, and south to Brazil and Chili. West Indies.

Genl. Char. Size small; ears reaching half-way between mouth and nostril; tragus triangular; wing and membranes from base of toes; no fur tuft at proximal end of forearm. Skull: rostrum broad; zygomata spreading; teeth large.

Color. Variable, ranging from yellowish red and fawn to yellowish gray; whitish space in front of shoulders.

Measurements. Total length, 103-110; tail vertebræ, 47.5-52.7; tibia, 18.6-19.6; foot, 7.4-7.9; forearm, 38.5-40.6; thumb, 6.3-7.3; longest finger, 79.3-82.8; ear from meatus, 10-11.9; tragus, 6.5-7. Skull: occipito-nasal length, 11; zygomatic width, 9; interorbital constriction, 4.5; mastoid width, 7.5; palatal length, 3.5; length of mandible, 8.5.

a.—**pfeifferi* (*Atalapha*), Gundl., Monatsb. K. Preuss. Akad. Wiss. Berl., 1861, p. 152.

PFEIFFER'S RED BAT.

Type locality. Cuba.

Geogr. Distr. Island of Cuba.

Genl. Char. Similar to *L. borealis*, but slightly larger, and has a larger first upper premolar, and the interfemoral membrane posteriorly is thinly covered with hair.

Color. General hue deep cherry red.

Measurements. Total length, 95.5; tail, 44.4; forearm, 44.7; third finger, 80.; fifth finger, 54.6; tibia, 20.3; foot, 8.6.

b.—*teliotis* (*Atalapha*), H. Allen, Proc. Am. Phil. Soc., XXIX, 1891, p. 5.

borealis teliotis (*Lasiurus*), Elliot, Syn. N. Am. Mamm., 1901, p. 413.

*For giving preference to *pfeifferi* over *blossevillei* see Allen, Proc. Biol. Soc. Wash., XIII, 1900, p. 165.

CALIFORNIA RED BAT.

Type locality. Unknown, California?

Geogr. Distr. Comodu, Lower California, Mexico, north to Sacramento Valley.

Genl. Char. Smaller than *L. borealis*; ear shorter, external basal lobe reduced; back of interfemoral membrane furred on basal third.

Color. Above dark chestnut, hairs sometimes tipped with gray; beneath paler; lower half of sides of neck white.

Measurements. Total length, 96-107; tail vertebræ, 45-57; tibia, 19.6-20; foot, 6.6-8.6; forearm, 37-40; thumb, 6.4-7; longest finger, 7.4-8.2; ear from meatus, 9.4-10; width of ear, 9-9.8; tragus, 5.4-6. Skull: occipito-nasal length, 12; zygomatic width, 10; mastoid breadth, 8; palatal length, 5; length of mandible, 9.

c.—mexicanus (*Atalapha*), Sauss., Rev. Mag. Zoöl., 2me Sér., XIII, 1861, p. 97.

frantzii Peters, Monatsb. K. Preuss. Akad. Wiss. Berlin, 1871, p. 908.

MEXICAN RED BAT.

Type locality. Southern Mexico.

Geogr. Distr. Tres Marias Islands, State of Jalisco, also in State of Vera Cruz, Mexico, south into Central America.

Genl. Char. Feet, interfemoral membrane, and beneath wings less hairy than *L. b. teliotis*.

Color. Same as *L. b. teliotis*.

Measurements. Total length, 113.3; tail vertebræ, 57; foot, 8.1; forearm, 41.2; thumb, 7.4; longest finger, 86.5; tragus, 6.5.



FIG. LXXXVIII. LASIURUS CINEREUS.

No. 105250 U. S. Nat. Mus. Coll. Twice nat. size.

561. cinereus (*Vespertilio*), Beauvois, Cat. Peale's Mus. Phil., 1796.
p. 15.

pruinus Say, Long's Exped. Rocky Mts., 1, 1823, p. 167. (Foot-note.)

cinereus (*Lasiurus*), Elliot, Syn. N. Am. Mamm., 1901, p. 413.

HOARY BAT.

Type locality. Philadelphia, Pennsylvania.

Geogr. Distr. North America from the Atlantic to the Pacific, at different seasons, south through Mexico, Central and South America to Chili.

Genl. Char. Size large; ears with edges black; foot half as long as tibia.

Color. Above umber brown, hairs tipped with silvery white; throat, head, and under side of membranes yellowish brown; band of umber brown below throat; ventral surface whitish.

Measurements. Total length, 130-140; tail vertebræ, 52-58; tibia, 23-24; foot, 9-10; forearm, 46-55; thumb, 10-10.6; longest finger, 101-110; ear from meatus, 17-18; width of ear, 15-17.7; tragus, 9-9.5. Skull: occipito-nasal length, 17; Hensel, 9; zygomatic width, 11; mastoid breadth, 10; palatal length, 7.5; inter-orbital constriction, 4.5; length of mandible, 12; lower tooth row exclusive of incisor, 6.

118. *Dasypterus*.

$$I_{\frac{1-1}{3-3}}, C_{\frac{1-1}{1-1}}, P_{\frac{1-1}{2-2}}, M_{\frac{3-3}{3-3}} = 30.$$

Dasypterus Peters, Monatsb. K. Preuss. Akad. Wiss. Berlin, 1870, (1871), p. 912. Type *Lasiurus intermedius* Allen.

Upper incisor in contact with canine; skull short, very broad and deep; ear tapering at tip, naked on half of dorsal surface; interfemoral membrane furred on half of dorsal surface; mammæ four.

KEY TO THE SPECIES AND SUBSPECIES.

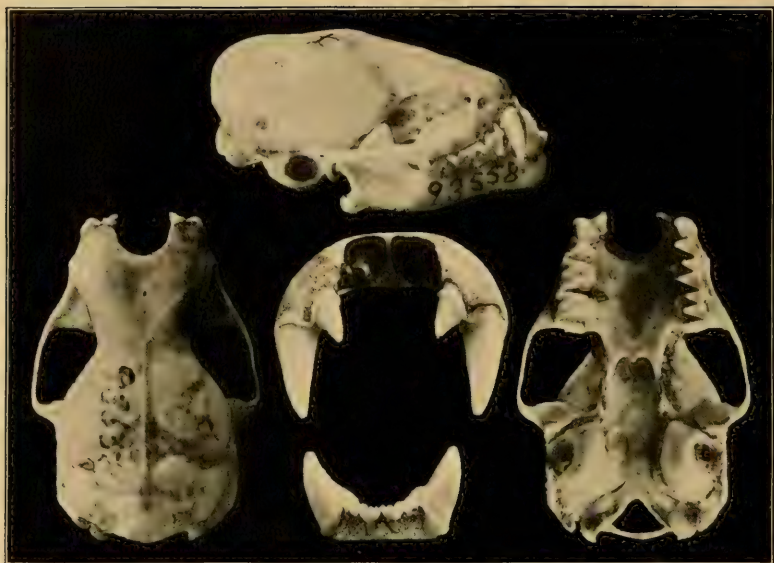
	PAGE
A. Posterior third of interfemoral naked.	<i>D. intermedius</i> 595
B. Posterior half of interfemoral naked.	
a. Cheeks not black.	<i>D. ega xanthinus</i> 597
b. Cheeks black.	<i>D. ega panamensis</i> 597

562. intermedius (*Lasiurus*), H. Allen, Proc. Acad. Nat. Scien. Phil., 1862, p. 246. Elliot, Syn. N. Am. Mamm., 1901, p. 414.

INTERMEDIATE BAT.

Type locality. Matamoros, State of Tamaulipas, Mexico.

Geogr. Distr. State of Tamaulipas, Mexico, north to Gulf States of the United States.

FIG. 111. *DASYPTERUS EGA XANTHINUS*.

No. 93558 U. S. Nat. Mus. Coll.

Enlarged $2\frac{1}{2}$ times. Face view enlarged 5 times.

Genl. Char. Size large; skull broad; membranes thick, leathery; free border of uroptagium longer than calcar.

Color. Light yellowish brown, hairs on back tipped with dusky; hairs dark plumbeous at base.

Measurements. Total length, 120-145; tail vertebræ, 52-65.9; tibia, 18-24.9; foot, 8-10; forearm, 45.5-55; thumb, 6-8.9; longest

FIG. LXXXIX. *DASYPTERUS INTERMEDIUS*.No. 14329 U. S. Nat. Mus. Coll. $1\frac{1}{2}$ times nat. size.

finger, 95-111; ear from meatus, 17-18.8; width of ear, 14-15.5; tragus, 8-9.4. Skull: occipito-nasal length, 17.5; zygomatic width, 13.5; mastoid width, 11; palatal length, 7; postpalatal length, 9; length of mandible, 12.

ega xanthinus (*Dasypterus*), Thomas, Ann. Mag. Nat. Hist., 6th Ser., 1897, p. 544.

SIERRA LAGUNA BAT.

Type locality. Sierra Laguna, Lower California, Mexico.

Geogr. Distr. Lower California, Mexico.

Genl. Char. Similar to *D. ega*, but more yellow above.

Color. Above, anteriorly yellow grading into fulvous on the interfemoral membrane; under parts dull fulvous.

Measurements. Total length, 116; tail vertebræ, 48; hind foot, 10; ear, 16. Skull: greatest length, 16.2; greatest breadth, 11.4; occipito-nasal length, 14; interorbital constriction, 4; palatal length, 5; breadth of rostrum at posterior edge of large premolar, 7; length of mandible, 11.

ega panamensis (*Dasypterus*), Thomas, Ann. Mag. Nat. Hist., 7th Ser., VIII, 1901, p. 246.

PANAMA BAT.

Type locality. Bogava, Chiriqui, Panama. Altitude, 1,000 feet.

Geogr. Distr. South Central America; range unknown.

Color. Cheek black; rump and hairs on interfemoral membrane brownish fulvous; remaining parts dark brownish clay color; the fur is black at base, then brownish buffy, with black tips.

Measurements. "Forearm, 46.5." (Thomas, l. c.) No other dimensions given.

119. *Nyticteius.

$$I. \frac{1-1}{3-3}; C. \frac{1-1}{1-1}; P. \frac{1-1}{2-2}; M. \frac{3-3}{3-3} = 30.$$

Nycticeius Rafin., Journ. Phys., LXXXVIII, 1819, p. 417. Type (by elimination) *Vespertilio humeralis* Rafinesque.

Upper incisor not in contact with canine; outer lower incisor equal to others in size, tricuspidate; uropatagium furred only at base; tip of tail free; tragus bent forward; skull narrow.

*Nytictejus and Nycticeius, though objectionably compounded, are both permissible, and possibly, if there is any choice between them, the latter may be preferable.



FIG. 112. NYCTICEIUS HUMERALIS.

No. 36652 U. S. Nat. Mus. Coll.

Enlarged $2\frac{1}{2}$ times. Face view enlarged 6 times.

KEY TO THE SPECIES AND SUBSPECIES.

PAGE

- A. Tragus short, broad; upper parts umber brown. *N. humeralis* 598
 B. Tragus oblong, narrowed; upper parts light
 tawny.....*N. h. cubanus* 599

563. *humeralis* (*Vespertilio*), Rafin., Amer. Month. Mag., III, 1818,
 p. 445.

crepuscularis, Rafin., Journ. Phys., LXXXVIII, 1819, p. 417.

humeralis (*Nycticejus*) Elliot, Syn. N. Am. Mamm., 1901, p. 415.



FIG. XC. NYCTICEIUS HUMERALIS.

No. 84656 U. S. Nat. Mus. Coll. Nearly twice nat. size.

RAFINESQUE'S BAT.

Type locality. Kentucky.

Geogr. Distr. State of Tamaulipas, Mexico, north to Arkansas and eastern United States; Cuba; Central America?

Genl. Char. Size medium; ears small, thick, naked, except at base; tragus short, broad, blunt at posterior base; membrane thick; uropatagium at middle of terminal caudal vertebra.

Color. Above umber brown; beneath paler; fur at base plumbeous.

Measurements. Total length, 91.4-93.5; tail vertebræ, 35.8-37.2; tibia, 13.4-13.8; foot, 6.7-7.7; forearm, 34.3-36.4; thumb, 5.3-5.6; longest finger, 63.4-65.2; ear from meatus, 12.7-13.9; width of ear, 8.8-10.5; tragus, 5.1-6.2. Skull: occipito-nasal length, 12; zygomatic width, 10; mastoid breadth, 7.5; interorbital constriction, 4; length of mandible, 4.

a.—cubanus (*Vesperus*), Gundl., Monatsb. K. Preuss. Akad. Wiss. Berl., 1861, p. 150.

GUNDLACH'S BAT.

Type locality. Near Cardenas, Cuba.

Geogr. Distr. Island of Cuba.

Genl. Char. Size small; color pale, similar to that of *N. humeralis*.

Color. "Above light tawny (fur blackish at base), beneath pale reddish tawny, fur black at base; face and membranes blackish brown; nose appears somewhat divided by the projecting nostrils; between the nose and the ears there is on each side a protuberance with bristly hairs; ears oval, lengthened (8 mm. high in front). The anterior base rounded and spreading outward; the posterior at the angle of the mouth forms a semicircle; this semicircle which bends inward to the tragus, forms another rounded enlargement; tragus oblong, scarcely narrowed throughout, somewhat bent in the form of a sickle forward, and provided with a tooth-shaped lobule at the base of the exterior border; nails tawny."

Measurements. (Dry skin.) Total length of body, 0.045; tail, 0.029; head, 0.016; ear, 0.012; forearm, 0.030; thumb, 0.005½; second finger, 0.029½; third finger, 0.055; fourth finger, 0.046; fifth finger, 0.040; tibia, 0.011; foot, 0.006¾; calcar, 0.013." (Gundlach.)

120. Rhogöessa.

$$I \frac{1-1}{3-3}; C \frac{1-1}{3-3}; P \frac{1-1}{2-2}; M \frac{3-3}{3-3} = 34.$$

Rhogoëssa H. Allen, Proc. Acad. Nat. Scien. Phil., 1866, p. 285.

Type *Rhogöessa tumida* H. Allen.

First and second lower incisors with outer cusp obsolete; third unicuspidate, very small; upper incisors in contact with canines or close to them; tragus straight or bent backward; tail vertebræ within interfemoral membrane.

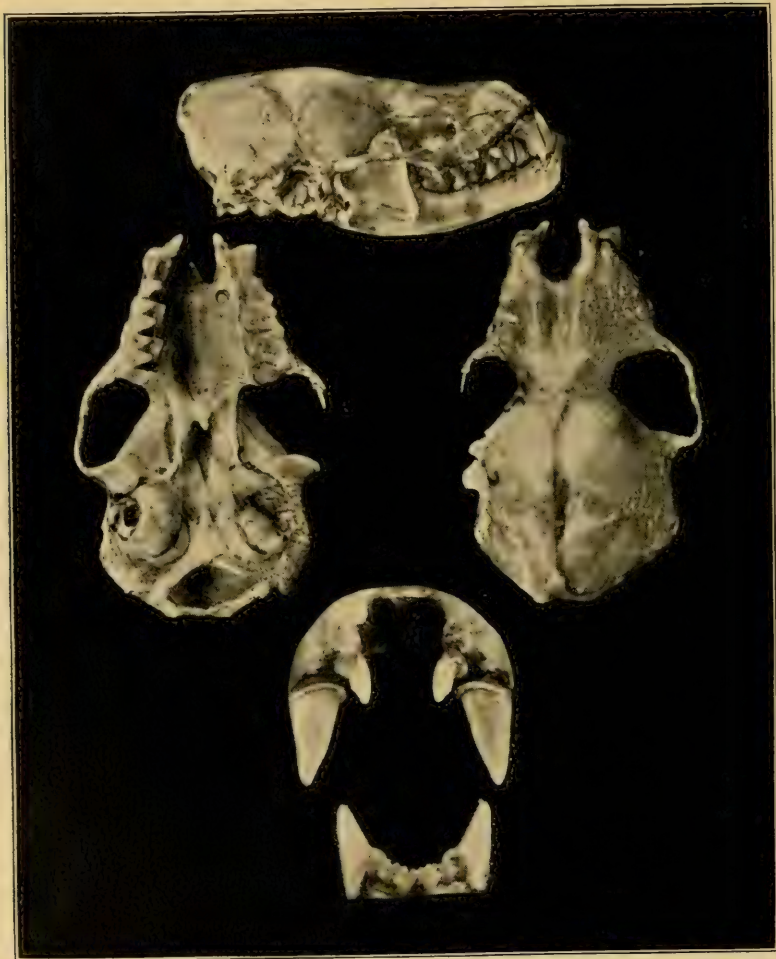


FIG. 113. RHOGÖESSA TUMIDA.

No. 36062 U. S. Nat. Mus. Coll.

Enlarged 4 times. Incisors enlarged 6 times.

KEY TO THE SPECIES AND SUBSPECIES.

	PAGE
A. Ears reaching tip of nose.	
a. Fur yellowish brown throughout..... <i>R. tumida</i>	601
b. Fur chestnut brown; grayish brown at base.... <i>R. parvula</i>	601
B. Ears reaching beyond nose.	
a. Foot not above 6 mm.; lateral lower incisor about one-half as large as those in center:..... <i>R. gracilis</i>	602
b. Foot 7 mm. or over; lateral lower incisor minute, invisible from the front..... <i>R. alleni</i>	602



FIG. XCI. RHOGÖESSA TUMIDA.

No. 3662 U. S. Nat. Mus. Coll. 3 times nat. size.

564. *tumida* (*Rhogöessa*), H. Allen, Proc. Acad. Nat. Scien. Phil., 1866, p. 286.

RESTLESS BAT.

Type locality. Mirador, State of Vera Cruz, Mexico.

Geogr. Distr. Southern Mexico into Central America.

Genl. Char. Ears reaching tip of nose; ear conch narrow and rounded above; upper third of lower margin hollowed beneath tip; tragus long, pointed; calcar longer than free border of uropatagium, ending in a keeled lobule; wings from base of toes; membranes chiefly naked; foot about half the length of tibia.

Color. Dull yellowish brown, rather paler on under parts.

Measurements. Total length, 65.5-75; tail vertebræ, 25.4-33; foot, 5-7; forearm, 28-33; thumb, 4-4.8; longest finger, 51-63; ear, 12.4-14; tragus, 7-7.4. Skull: greatest length, 13; zygomatic width, 8.4; width of rostrum, 5; length of mandible, 9; length of upper tooth row, 5.6.

565. *parvula* (*Rhogöessa*), H. Allen, Proc. Acad. Nat. Scien. Phil., 1866, p. 285.

TRES MARIAS BAT.

Type locality. Tres Marias Islands, State of Jalisco, Mexico.

Geogr. Distr. Tres Marias Islands, State of Jalisco, through Mexico to Costa Rica, Central America.

Genl. Char. Wart above eye and another beneath chin; membranes naked except a small furry patch on basal fourth of inter-femoral membrane.

Color. Chestnut brown above, base of fur grayish brown; beneath grayish fawn.

Measurements. Total length, 65.5; tail vertebræ, 29.5; foot, 5.3; forearm, 27.4; thumb, 4.1; longest finger, 48.5; tragus, 6.4.

566. gracilis (*Rhogöessa*), Miller, N. Am. Faun., No. 13, 1897, p. 126.
GRACEFUL BAT.

Type locality. Piaxtla, State of Puebla, Mexico.

Geogr. Distr. State of Puebla, Isthmus of Tehuantepec, Mexico.

Genl. Char. Ears extending beyond tip of nose; feet and legs long, slender; calcar slender; free border of uropatagium naked; wings from base of toes.

Color. Above chestnut; beneath paler.

Measurements. Total length, 77-82; tail vertebræ, 37-41; foot, 5-6; forearm, 30-33; thumb, 4; longest finger, 58-61; ear, 16-17; tragus, 9-10.

567. alleni (*Rhogöessa*), Thomas, Ann. Mag. Nat. Hist., 6th Ser., x,
1892, p. 477.

SANTA ROSALIA BAT.

Type locality. Santa Rosalia, near Autlin, State of Jalisco, Mexico.

Geogr. Distr. Known from type locality only.

Genl. Char. "Larger than *R. parvula*; ears reaching beyond nostrils; inner margin convex forward below, straight or slightly concave above; tragus long, inner edge straight, outer slightly convex, edge indistinctly crenulate; lobule at base of outer margin."

Color. No description of color given; alcoholic specimen.

Measurements. Tail vertebræ, 41; foot, 7.1; forearm, 35; thumb, 5; tragus, 7. "Skull: occiput to gnathion, 14.7; greatest breadth, 9.5; front of canine to back of third molar, 5.4." (Thomas, l. c.)

Resembling the genus *Plecotus* of the Old World, the next genus CORYNORHINUS, however, is distinguished for the conspicuous club-like glandular prominences possessed by its members on the sides of the muzzle and which nearly meet in the center behind the nostril.

Subfam. II. *Plecotinæ*.121. *Corynorhinus*.

$$I. \frac{2-2}{3-3}; C. \frac{1-1}{1-1}; P. \frac{2-2}{3-3}; M. \frac{3-3}{3-3} = 36.$$

Corynorhinus H. Allen, Proc. Acad. Nat. Scien. Phil., 1865, p. 173.

Type *Plecotus macrotis* Le Conte.

Plecotus Le Conte McMurtr., Cuv., Anim. King., 1, App. 1831, p. 431. (nec Geoff.)

Synotis H. Allen, Mon. N. Am. Bats, 1864, p. 62. (nec Keyserl. & Blas.)

Ears large, joined across forehead; tragus free from external basal lobe; thick ridge ending in club-shaped enlargement between eye and nostril; nostrils margined by rudimentary nose-leaves or grooves. Skull slender, arched; rostrum small, weak.



FIG. 114. *CORYNORHINUS MACROTIS*.

No. 101303 U. S. Nat. Mus. Coll.

Enlarged 3 times. Incisors enlarged 7 times.

KEY TO THE SPECIES.

PAGE

- A. Above yellowish drab gray; beneath paler. *C. m. pallescens* 604
 B. Above and beneath dark brown. *C. m. townsendi* 604



FIG. XCII. *CORYNORHINUS MACROTIS*.
No. 102501 U. S. Nat. Mus. Coll.

macrotis pallescens (*Corynorhinus*), Miller, N. Am. Faun., No. 13, 1897, p. 52. Elliot, Syn. N. Am. Mamm., 1901, p. 399.

townsendi H. Allen, Mon. N. Am. Bats, 1893, p. 58. (nec Cooper.)

BIG-EARED BAT.

Type locality. Kearn Cañon, Navajo County, Arizona.

Geogr. Distr. From State of Oaxaca, Mexico, through eastern Mexico to California.

Genl. Char. Similar to those of *C. macrotis*; color paler.

Color. Back yellowish drab gray; head paler, base of hairs light plumbeous; beneath paler than back; ears and membranes light brown.

Measurements. Total length, 90-105; tail vertebrae, 45-49; tibia, 19-21; foot, 9-9.6; forearm, 9-9.6; thumb, 5-7; longest finger, 71-77; ear from meatus, 33-33.9; width of ear, 20-23.7; tragus, 12.7-14.6. Skull: greatest length, 16; zygomatic breadth, 9; width of rostrum at posterior border of large premolar, 5; length of mandible, 10.6; length of upper molar series, 5.2; of lower molar series, 6.8.

macrotis townsendi (*Plecotus*), Cooper, Ann. Lyc. Nat. Hist., N. Y., IV, 1848, p. 73. (nec Allen.)

m. townsendi (*Corynorhinus*), Elliot, Syn. N. Am. Mamm., 1901, p. 399.

TOWNSEND'S BIG-EARED BAT.

Type locality. Columbia River, Oregon.

Geogr. Distr. State of Guadalajara, Mexico, north to British Columbia.

Genl. Char. Similar to those of typical *C. macrotis*, but color much darker, fur nowhere distinctly bicolor.

Color. Above dark brown, hairs at base light plumbeous, tips pale yellowish; beneath dark brown; ears and membranes blackish.

Measurements. Total length, 100-105; tail vertebrae, 48-51; tibia, 21.4-22; foot, 9.4-10; forearm, 42-44; thumb, 6.6-7; longest finger, 7.6-8.0; ear from meatus, 3.3-3.4; width of ear, 2.1-2.4; tragus, 1.4-1.5. Skull: total length, 14.5; occipito-nasal length, 12.5; zygomatic width, 8; interorbital constriction, 3.5; length of mandible, 8.6; length of upper molar series, 3.5; of lower molar series, 4.5.

The previous genus and the next are the only ones of the Plecotine or Antrozoin divisions found within the limits of the countries embraced in this book. The one following has two species and one race remarkable among all those of the family for having but four lower incisors.

Subfam. III. **Antrozoinæ.**

122. **Antrozous.**

$$I_2^1 \frac{1}{2}; C_1^1 \frac{1}{2}; P_2^1 \frac{1}{2}; M_3^3 \frac{3}{3} = 28.$$

Antrozous II. Allen, Proc. Acad. Nat. Scien., Phil., 1862, p. 248.

Type *Vespertilio pallidus* Le Conte.

Muzzle truncate; nostrils surrounded by a horseshoe-shaped ridge; lower lip free in front. Lower incisors, four. Mammeæ two.

KEY TO THE SPECIES.

	PAGE
A. Above pale drab gray, beneath grayish white . . . <i>A. pallidus</i>	605
B. Above ochraceous buff, beneath yellowish drab brown. <i>A. p. pacificus</i>	607
C. Above buff washed with wood brown; beneath clear buff. <i>A. minor</i>	607

568. pallidus (*Vespertilio*), Le Conte, Proc. Acad. Nat. Scien., Phil., 1856, p. 437.

pallidus (*Antrozous*), Elliot, Syn. N. Am. Mamm., 1901, p. 396.

BIG-EARED PALE BAT.

Type locality. El Paso, El Paso County, Texas.



FIG. 115. ANTROZOUS PALLIDUS.

Enlarged $2\frac{1}{2}$ times. Nose view enlarged 6 times.

Geogr. Distr. Western Mexico, Cape St. Lucas, Lower California, north to Nevada, east to Texas.

Genl. Char. Size large; ears large, when laid forward going beyond tip of nose; tragus straight and slender, posterior margin faintly crenulate; feet half as long as tibia; wing membranes attached at base of toes; interfemoral membrane at base of terminal caudal vertebræ. Skull: braincase, rostrum, and palate broad; teeth large, strong, lower incisors four.

Color. Above pale drab gray or fawn, tips of hairs dusky; face dark brown; beneath grayish white; sides tinged with drab.



FIG. XCIII. ANTROZOUS PALLIDUS.

ex Dobson, Cat. Chiroptera. ♂ nat. size.

Measurements. Total length, 105-115; tail vertebrae, 44.6-46; tibia, 20-21; foot, 10; forearm, 49-51; thumb, 8.3-9; longest finger, 85-92; ear from tragus, 28-30; width of ear, 18.4-20; tragus, 11.6-14. Skull: greatest length, 21; basal length, 19; interorbital constriction, 4.6; zygomatic breadth, 12.8; mastoid breadth, 10; breadth of braincase above roots of zygomata, 9; mandible, 13; maxillary tooth row, 8; mandibular tooth row, 8.

a.—pacificus (*Antrozous*), Merriam, Proc. Biol. Soc. Wash., XI, 1897, p. 180. Elliot, Syn. N. Am. Mamm., 1901, p. 397.

PACIFIC PALE BAT.

Type locality. Old Fort Tejon, in mountains south of Kern Lake, Kern County, California.

Geogr. Distr. Lower California, Mexico, north to California.

Genl. Char. Similar to *A. pallidus*, but slightly larger. Skull: braincase, rostrum, and bony palate narrower; supraoccipital more pointed and overhanging; teeth larger.

Color. Above yellowish drab ("ochraceous buff, washed with dusky" type); hairs tipped with dusky; beneath yellowish drab brown.

Measurements. Total length, 114-118; tail vertebrae, 46.7-47.8; tibia, 20-22.6; foot, 10.8-12; thumb, 9-10; longest finger, 91-96. Skull: total length, 20.5; occipito-nasal length, 18.5; zygomatic width, 10.8; interorbital constriction, 4; width of braincase, 9.5; length of mandible, 11.5; length of upper molar series, 5.5; of lower molar series, 6.7.

569. minor (*Antrozous*), Miller, Proc. Acad. Nat. Scien. Phil., 1902, p. 389.

LITTLE COMONDU BAT.

Type locality. Comondu, Lower California, Mexico.

Genl. Char. Size small. Skull narrow; crown of upper premolar and first and second upper molars shorter in proportion to their width than in the other species; lower molars small.

Color. Above buff washed with wood brown; beneath buff grading into cream buff on middle of belly.

Measurements. Total length, 93; tail, 35; forearm, 48; thumb, 9.6; second finger, 40; third finger, 80; fourth finger, 68; fifth finger, 63; tibia, 20; foot, 10; ear from meatus, 23; from crown, 19; width, 16; tragus, 11.4. Skull: greatest length, 19; interorbital constriction, 4; zygomatic breadth, 11; mastoid breadth, 9; breadth of braincase above roots of zygomata, 8.6; maxillary tooth row, 6.8; mandibular tooth row, 7.6.

Fam. II. **Noctilionidæ. Large-eared Bats.**Subfam. I. **Emballonurinae.****Noctilionidæ** Gray, Lond. Med. Repos., 1821, p. 299.*Emballonuridæ* Dobson, Ann. Mag. Nat Hist., 4th Ser., XVI, 1875, p. 347.

No distinct cutaneous foliaceous appendages surrounding the nostrils, which open by a simple valvular aperture at the projecting extremity of the muzzle, which is truncate; ears large, often united; tragi short, expanded above; middle finger with two phalanges; tail partially free, extending beyond the posterior margin of interfemoral membrane, or perforating it and appearing on upper surface. Upper incisors large and separated from the canines; molars with W-shaped cusps.

123. Rhynchonycteris.

$$I. \frac{1-1}{3-3}; C. \frac{1-1}{1-1}; P. \frac{2-2}{2-2}; M. \frac{3-3}{3-3} = 32.$$

Rhynchonycteris Peters, Monatsb. K. Preuss., Akad. Wiss. Berl., 1867, p. 477. Type *Vespertilio naso* Wied.

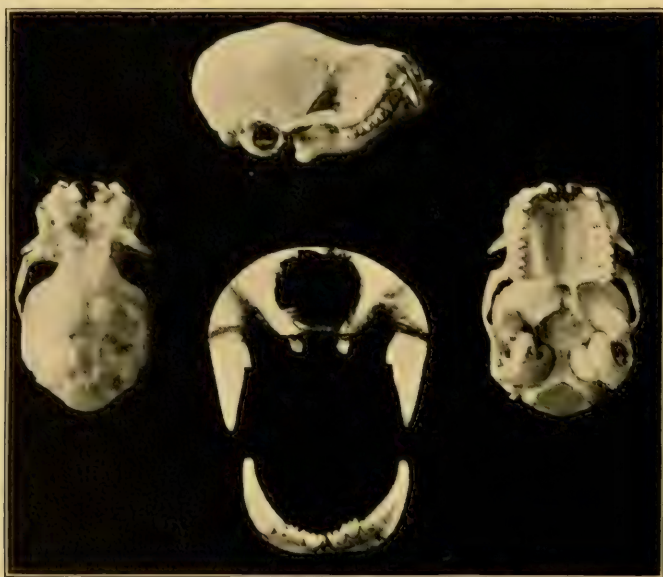


FIG. 116. RHYNCHONY TERIS NASO.

No. 5695 Acad. Nat. Sci.

Enlarged 2½ times. Nose view enlarged 8 times.

Tail shorter than the interfemoral membrane, but penetrating the membrane and appearing on the upper surface; muzzle very narrow, the extremity produced beyond lower lip; ears not attached; ear conch narrow, attenuate; antitragus rounded, distinct; nostrils oval, horizontal; wings from ankles; antebrachial membrane without sac; calcaneum longer than tibia.

- 570. naso** (*Rhynchonycteris*), Wied, Schinz's *Thierr.*, I, 1821, p. 179.
saxatilis Spix. *Simiar. et Vespert. Bras.*, 1823, p. 62, pl. xxxv, fig. viii.
rivalis Spix. *Simiar. et Vespert. Bras.*, 1823, p. 62, pl. xxxv.
lineata Temm., *Mon. Mamm.*, II, 1835-41, p. 297.



FIG. XCIV. RHYNCHONYCTERIS NASO.
 No. 5695 Acad. Nat. Sci. Coll. Nat. size.

LONG-NOSED BAT.

Type locality. East coast of Brazil.

Geogr. Distr. Guatemala through Central America to Brazil, South America.

Genl. Char. Those of the genus. Incisors small, weak; upper canines with an internal basal cusp; first upper premolar small with anterior basal cusp close to canine; diastema between canine and second premolar; lower second premolar narrow, long.

Color. Above brown, ends of hairs grayish, under parts grayish white.

Measurements. Total length, 53.3; tail, 41.9; forearm, 36.5; thumb, 6.3; third finger, metacarpal, 34.2; fourth finger, metacarpal, 27.9; fifth finger, 25.4; tibia, 12.7; foot, 6.3. Skull: total length, 11; occipito-nasal length, 10; Hensel, 8.5; zygomatic width, 6.5; interorbital constriction, 2.5; palatal length, 4; length of upper molar series, 2.5; length of mandible, 6.5; length of lower molar series, 4.

124. Saccopteryx.

$$I. \frac{1-1}{3-3}; C. \frac{1-1}{1-1}; P. \frac{2-2}{2-2}; M. \frac{3-3}{3-3} = 32.$$

Saccopteryx Illig., Prodr. Syst. Mamm. et Av., 1811, p. 121. Type *Vespertilio lepturus* Schreber.

Urocryptus Temm., Tijdschr. Nat. Geschied., v, 1838-39, pp. 31-34, pl. 11, figs. 3, 4. *Id.* Mon. Mamm., 11, 1835-41, p. 294. (Part.)

Centronycteris Gray, Mag. Zoöl. Bot., 11, 1838, p. 499. Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1867, p. 478.

Upper incisors unicuspidate, weak; Antebrachial membrane with a pouch opening on its upper surface in the male; rudimentary or wanting in the female; tragus narrowed above; muzzle extending beyond lower lip; wings from the ankles; interfemoral membrane extending beyond where the tail pierces through, large; wing sac with opening along forearm.



FIG. 117. SACCOPTERYX BILINEATA.

No. 78514 U. S. Nat. Mus. Coll.

Enlarged 2½ times. Face view enlarged 6 times.

A. Saccopteryx.

Wing sac with opening along forearm.

571. bilineata (*Urocryptus*), Temm., V. d. Hoev. Tijds. Nat. Gesch., v, 1838, p. 33, figs. 3, 4.

WHITE-STRIPED BAT.

Type locality. Surinam.

Geogr. Distr. Guatemala to Dutch Guiana, South America.

Genl. Char. Like those of genus; size large; longitudinal stripes on back.

Color. Above dark brown with two white stripes along the center of the back; under parts, fur brown at base, ashy at tip.

Measurements. Total length, 42.6; tail, 15.2; forearm, 35.5; thumb, 5.8; third finger, metacarpal, 34.2; fifth finger, metacarpal, 29.2; tibia, 15.2; foot, 52.8; ear, 12.7; tragus, 3.5. Skull: occipito-nasal length, 14; Hensel, 11.5; zygomatic width, 10; interorbital constriction, 2; width of braincase, 8; palatal length, 5; length of upper molar series, 5; length of mandible, angle to symphysis, 12; length of lower molar series, 6.

125. *Balantiopteryx*.

Balantiopteryx Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1867, p. 476. Type *Balantiopteryx plicata* Peters.

Wing sac opening in center of antebrachial membrane.

572. *plicata* (*Balantiopteryx*), Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1867, p. 476.



FIG. 118. *BALANTIOPTERYX PLICATA*

No. 8902 Field Columbian Mus. Coll

Enlarged $2\frac{1}{2}$ times. Face view enlarged 5 times.

POUCHED BAT.

Type locality. Puento Arenas, Costa Rica.

Geogr. Distr. State of Jalisco, opposite Tres Marias Islands, Mexico, into Central America.

Genl. Char. Nostrils resembling those of *Taphozous*, no groove above; ear conch straight on inner margin, with a tooth near base; outer margin straight terminating on a level with the angle of the mouth.

**Color.* Above dark brown, beneath paler; a white line extends from the ankles to the extremity of the fore finger along the margin

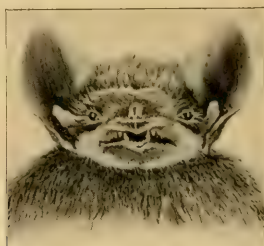


FIG. XCV. BALANTIOPTERYX PLICATA.

Slightly larger than life size.

of the wing membrane; wing and interfemoral membranes partly furred.

Measurements. Total length, 29.2; forearm, 43.1; foot, 8.8; ear, 13.9. Skull: occipito-nasal length, 13; Hensel, 10; zygomatic width, 9; interorbital width, 3; width of braincase at auditory meatus, 8; height of braincase above auditory meatus, 7; distance across last molar from outer edge, 7; length of upper molar series, 4; palatal length, 4; length of mandible, 10; length of lower molar series, 4.

573. infusca (*Saccopteryx*), Thomas, Ann. Mag. Nat. Hist., 6th Ser., xx, 1897, p. 546.

THOMAS'S BAT.

Type locality. Cachavi, Northern Ecuador.

Geogr. Distr. Coban, Guatemala, to Ecuador, South America.

Genl. Char. Similar to *S. plicata*, but smaller and darker; ears narrower; posterior edge of wing membrane not white.

Color. Dark chestnut brown above, paler beneath.

Measurements. Total length, 55; tail, 13; ear, 11.3; tragus, 3.3; calcar, 14.

*An alcoholic specimen in the Field Museum when dried is a lavender gray above and paler beneath, and it does not seem that it could ever have been dark brown. It came from Puerta de Ixtla, State of Morelos, Mexico.



FIG. 119. PEROPTERYX CANINA.

No. 102930 U.S. Nat. Mus. Coll.

Enlarged $2\frac{1}{2}$ times. Nose view enlarged 8 times.**126. Peropteryx.**

Peropteryx Peters, Monatsb. K. Preuss. Wiss. Berl., 1867, p. 472.
Type *Vespertilio caninus* Wied.

Wing sac with opening near anterior margin of antebrachial membrane.



FIG. XCVI. PEROPTERYX CANINA.

No. 102939 U. S. Nat. Mus. Coll. Enlarged $2\frac{1}{2}$ times nat. size

574. canina (*Vespertilio*), Wied, Schinz's *Thierr.*, 1, 1821, p. 179.

DOG-LIKE BAT.

Type locality. East coast of Brazil.

Geogr. Distr. Guatemala, Central America, to Brazil.

Genl. Char. Ears as long as head, broad; tragus without lobe at base of outer margin; antebrachial pouch in center of anterior half of upper surface of membrane, sac small; wings from ankles; terminal caudal vertebra pierces the membrane.

Color. Above dark brown; beneath paler.

Measurements. Total length, 66; tail, 15.2; forearm, 45.7; thumb, 7.6; third finger, metacarpal, 39.3; fourth finger, metacarpal, 33; fifth finger, metacarpal, 30.4; tibia, 19; foot, 8.8. Skull: occipito-nasal length, 13; zygomatic width, 8; interorbital constriction, 3; width of braincase, 7; palatal length, 4.

127. Declidurus.

$$I_{3-3}^{1-1}; C_{1-1}^{1-1}; P_{2-2}^{2-2}; M_{3-3}^{3-3} = 32.$$

Declidurus Weid, *Isis*, 1819, p. 1629. Type *Declidurus albus* Wied.

Muzzle not grooved on the sides; nostrils valvular; deep frontal

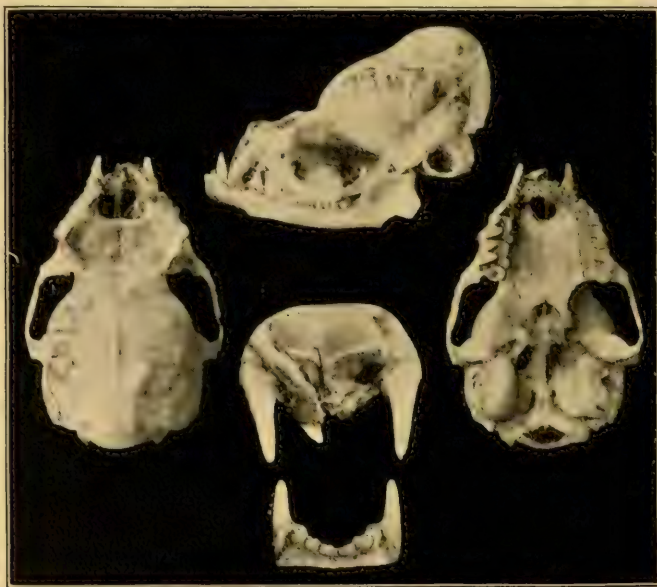


FIG. 120. DECLIDURUS ALBUS.

No. 7947 Coll. Am. Mus. Nat. Hist., N. Y.

Skull twice nat. size. Incisors enlarged 5 times.

excavation between eyes; eyes large; thumb short, the claw rudimentary and nearly contained in wing membrane; tail in a fold beneath interfemoral membrane, its apex perforating a pouch in center of the membrane and appearing on upper surface; upper incisors separated from canines; first upper premolar very small.

KEY TO THE SPECIES.

PAGE

- A. Upper incisors with a second external cusp. *D. albus* 615
 B. Upper incisors without second external cusp. *D. virgo* 615



FIG. XCVII. DECLIDURUS ALBUS.
 ex Dobson, Cat. Chiroptera.

575 albus (*Declidurus*), Weid, Isis, 1819, p. 1630.

freyreissii Wied, Abbild. zur. Naturg. Bras., pl. xvi.

WHITE BAT.

Type locality. Mouth of Rio Pardo, east coast of Brazil.

Geogr. Distr. Costa Rica, south to Brazil.

Genl. Char. Ears shorter than head, rounded; outer margin of ear conch straight, ending below the eye; tragus broad, short; upper incisors slender, acute, with a second external cusp; lower incisors trifold, central pair separated; first upper premolar very small; first lower premolar smaller than second; wings from ankles; claws on feet curved.

Color. General hue creamy white; hairs darker at base.

Measurements. Total length, 54.3; tail, 2.2; forearm, 51.8; thumb, 5.5; third finger, metacarpal, 58.4; fourth finger, metacarpal, 27.4; fifth finger, metacarpal, 26.4; tibia, 19; foot, 10.1. Skull: occipito-nasal length, 14.5; zygomatic width, 12; interorbital constriction, 5; depth of occiput, 7; width of braincase, 9; palatal length, 5.5; length of upper molar series, 5; of lower molar series, 7; length of mandible from angle, 15.

576. virgo (*Declidurus*), Thomas, Ann. Mag. Nat. Hist., 7th Ser., 1903, p. 377.

ESCAZU WHITE BAT.

Type locality. Escazu, Costa Rica.

Genl. Char. Upper incisors very weak, the main cone without

posterior secondary cusp; minute cusp on cingulum anteriorly, and a second posteriorly; small premolar separated from large premolar, and not occupying all the space between that tooth and the canine.

Color. "Upper parts pure white to roots of hairs, or gray mixed, the hairs then being slaty at base." Underneath the hairs on belly are slaty on basal halves; on chin and sides of body pure white.

Measurements. "Head and body, 80; tail, 22; hind foot, 10; ear, 13; forearm, 66; third finger, metacarpal, 64; first phalanx, 10; fifth finger, metacarpal, 35; first phalanx, 17; calcar, 22. Skull: greatest length, 18; front of canine to back of third upper molar, 8.1." (Thomas, l. c.)

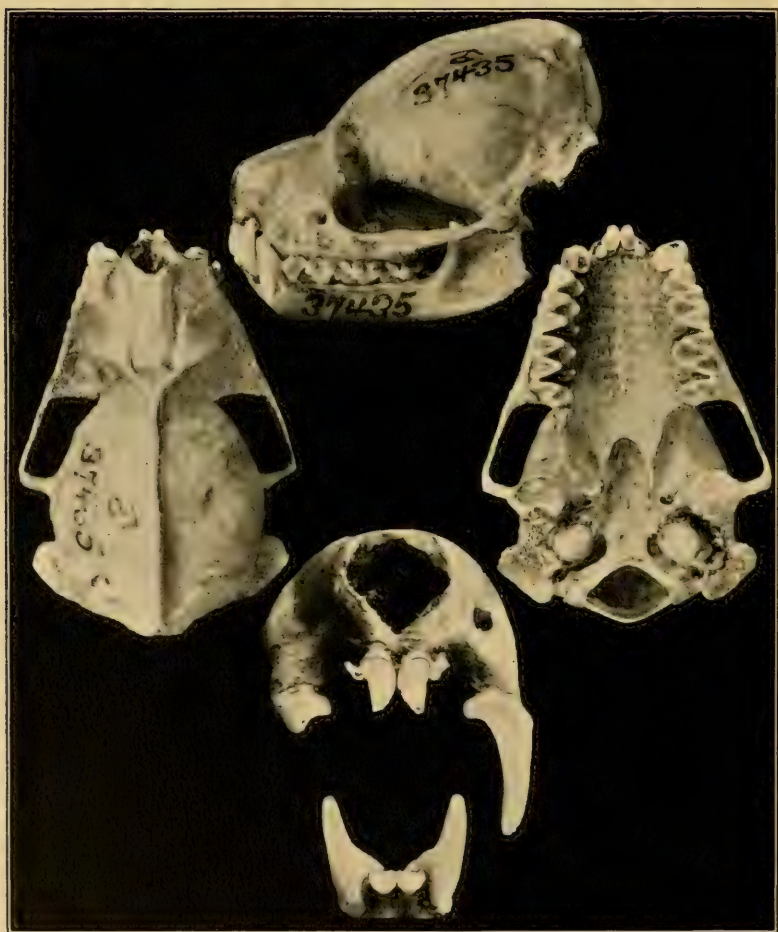


FIG. 121. NOCTILIO L. MASTIVUS.
No. 37435 U. S. Nat. Mus. Coll.
Enlarged twice nat. size. Incisors enlarged 4 times.

Subfam. II. **Noctilioninæ.****128. Noctilio.**

$$I. \frac{2-2}{1-1}; C. \frac{1-1}{1-1}; P. \frac{1-1}{2-2}; M. \frac{3-3}{3-3} = 28.$$

Noctilio Linn., Syst. Nat., 1, 1776, p. 88. Type *Vespertilio leporinus* Linnæus.

Ears from sides of head; tragus longer than broad, possessing tooth-like processes; antitragus at base of tragus in front; nose projecting beyond lower lip, nostrils oval; cutaneous ridges on chin; tail short, perforating interfemoral membrane, which extends far beyond its tip, third finger very long. Skull short, broad, with mastoid and



FIG. XCVIII. NOCTILIO L. MASTIVUS.
No. 5463 Acad. Nat. Sci. Coll.

paroccipital processes prominent; audital bullæ large; postorbital processes lacking; upper incisors unicuspidate, outer incisors very small.

leporinus mastivus (*Vespertilio*), Dahl, Skrift. Naturh. Selsk. Kjobenh., iv, 1797, p. 132, pl. 7.

dorsatus Wied, Beit. Natur. Bras., 1826, p. 223.

leporinus Burm., Thier. Bras., 1854, p. 60. (nec Linn.)

MUSKY BAT.

Type locality. Island of St. Croix.

Geogr. Distr. Islands of Jamaica, Mona, and St. Croix, West Indies, and in South America to Brazil.

Genl. Char. Slightly larger than *N. leporinus*; wing membrane attached along each side of spine, thin, transparent; face warty.

Color. Above yellowish brown; under parts varying from pale fawn to orange; a narrow pale fulvous line along middle of back; face purplish.

Measurements. Total length, 101.6; tail, 25.9; forearm, 82.5;

thumb, 11.7; third finger, metacarpal, 76.2; fourth finger, metacarpal, 76.4; fifth finger, metacarpal, 74.9; tibia, 36.8; foot, 25.6; ear, 25.4; tragus, 6.3. Skull: occipito-nasal length, 26; Hensel, 20; zygomatic width, 19; interorbital constriction, 7; length of nasals, 5; height of braincase above zygoma, 13; palatal length, 11; width between bullæ, 4.5; width between last molars, 6; length of upper molar series, alveolar border, 8.5; length of mandible, 16; height at coronoid process, 5.5; length of lower molar series, 10.

Fam. III. **Molossidæ.**

Tail extending far behind interfemoral membrane; legs short, strong.

129. **Molossus.**

$$I, \frac{1-1}{1-1} \text{ or } \frac{1-1}{2-2}; C, \frac{1-1}{1-1}; M, \frac{3-3}{3-3} = 20 \text{ or } 22.$$

Molossus Geoff., Ann. du Mus. Hist. Nat. Paris, vi, 1805, p. 154.

Type *Molossus rufus* E. Geoffroy.

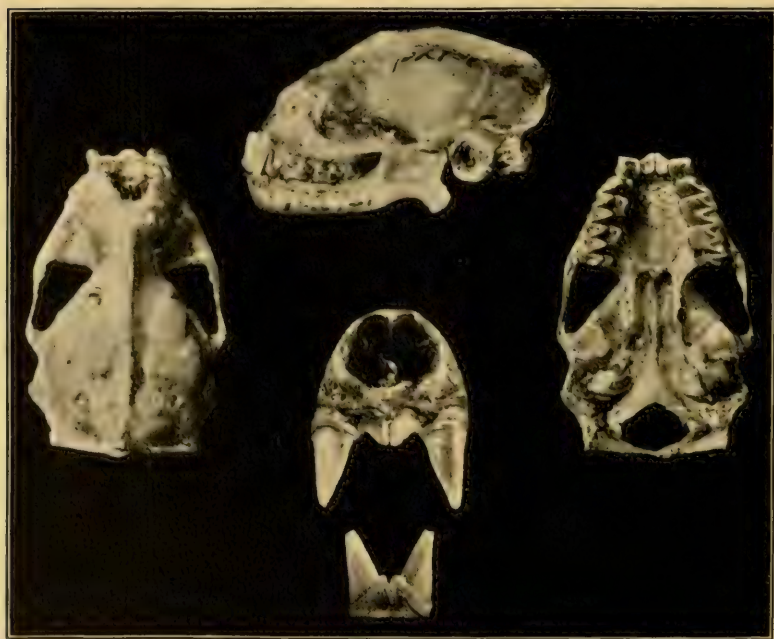


FIG. 122. **MOLOSSUS RUFUS.**

No. 102751 U. S. Nat. Mus. Coll.

Twice nat. size. Nose enlarged 4 times.

Dysopes Illig., Prodr. Syst. Mamm. et Av., 1811, p. 122.

Ears close together, or united at base of their inner margins; muzzle broad, obtuse or obliquely truncate; indistinct vertical wrinkles on lips, sometimes smooth; tragus short; first and fifth toes thickest, backs of all with long curved hairs. Upper incisors with their cusps close together in front.

KEY TO THE SPECIES.

	PAGE
A. Forearm over 50 mm.	
a. Above reddish brown.....	<i>M. rufus</i> 619
b. Above seal brown.....	<i>M. nigricans</i> 620
B. Forearm over 36 mm., under 50 mm.....	<i>M. obscurus</i> 620
C. Forearm not over 36 mm.....	<i>M. tropidorhynchus</i> 620



FIG. XCIX. MOLOSSUS RUFUS.

No. 102789 U. S. Nat. Mus. Coll. Nearly life size.

577. rufus (*Molossus*), Geoff., Ann. Mus. Hist. Nat. Paris, vi, 1805, p. 155.

ursinus, Spix, Simia. et Vespert. Bras., 1823, p. 58, pl. xxv, fig. 4.
alecto, Temm., Mon. Mamm., 1, 1827, p. 231.

holosericeus, Natt., Weigm., Archiv. f. Naturg., 1843, p. 368.

albus, Natt., Weigm., Archiv. f. Naturg., 1843, p. 368.

RUFIOUS MASTIFF BAT.

Type locality. Paraguay.

Geogr. Distr. Southern Mexico, through Central America to Paraguay and Bolivia, West Indies.

Genl. Char. Glandular sac directed forward, opposite the anterior extremity of the sternum in the male; ears shorter than head; antitragus circular; tragus small, acute; muzzle extending beyond the jaw; short erect hairs between nostrils; lips smooth; wing membrane from ankles.

Color. General hue of body above and beneath reddish brown.

Measurements. Total length, 128.2; tail vertebræ, 50.8; thumb, 10; forearm, 51; third finger, metacarpal, 50.8; fourth finger, metacarpal, 49.5; fifth finger, metacarpal, 26; tibia, 17.7; foot, 12.7; ear,

16.5; tragus, 2.5. Skull: greatest length, 23; basal length, 20; median palatal length, 7.2; interorbital constriction, 4.2; zygomatic breadth, 14; breadth of braincase above roots of zygomata, 11; mandible, 16.6; maxillary tooth row, 8.8; mandibular tooth row, 9.

a.—obscurus (*Molossus*), Geoff., Ann. Mus. Hist. Nat. Paris, vi, 1805, p. 155.

longicaudatus Geoff., Ann. Mus. Hist. Nat. Paris, vi, 1805, p. 155.

acuticaudatus Desm., Mamm., 1820, p. 116.

velox Temm., Mon. Mamm., i, 1827, p. 234.

fuliginosus Gray, Mag. Zoöl. Bot., II, 1838, p. 501.

olivaceo-fuscus Natt., Wagn., Abh. Akad. Münch., v, 1844, p. 202.

fumarius Burm., Thier. Bras., i, 1854, p. 71.

aztecus Sauss., Rev. Mag. Zoöl., 2me Sér., XII, 1860, p. 285.

DUSKY MASTIFF BAT.

Type locality. Paraguay.

Geogr. Distr. Guatemala, through Central America to Paraguay and Bolivia, South America.

Color. Varying from dark brown to fulvous; lighter on under parts; ears and membranes black.

Measurements. Total length, 79.5; tail, 26.9; forearm, 41.9; thumb, 7.6; third finger, metacarpal, 40.6; fourth finger, metacarpal, 39.6; fifth finger, metacarpal, 24; tibia, 13.9; foot, 10; ear, 13.9; tragus, 2.

578. *tropidorhynchus* (*Molossus*), Gray, Ann. Nat. Hist., iv, 1839 p. 6. Sept.

PUG-NOSED MASTIFF BAT.

Type locality. Cuba.

Geogr. Distr. West India Islands.

Genl. Char. Similar to *M. r. obscurus*, but smaller; forearm shorter.

Color. Above mummy brown; beneath Prout's brown.

Measurements. Total length, 83-90; forearm, 32-36; tail, 27-30.

579. *nigricans* (*Molossus*), Miller, Proc. Acad. Nat. Scien. Phil., 1902, p. 395.

BLACKISH MASTIFF BAT.

Type locality. Acaponeta, Territorio de Tepic, Mexico.

Genl. Char. Larger than *M. rufus*, with a heavier rostrum and wider interpterygoid space and palate; teeth heavier.

Color. Upper parts dark seal brown with a crescentic area of broccoli brown on the shoulders; under parts seal brown washed with broccoli brown, strongest on the throat; ears and membranes blackish brown. A red phase also exists.

Measurements. Total length, 145; forearm, 52.6; thumb, 9;

second finger, 48; third finger, 100; fourth finger, 80; fifth finger, 51; tibia, 18.6; foot, 12. Skull: greatest length, 17.2; basal length, 15; interorbital constriction, 3.4; zygomatic breadth, 10; breadth of braincase above roots of zygomata, 8.8; mandible, 12.4; maxillary tooth row, 6.4; mandibular tooth row, 7.

130. Promops.

$$I. \frac{1-1}{2-2}; C. \frac{1-1}{1-1}; P. \frac{2-2}{2-2}; M. \frac{3-3}{3-3} = 30.$$

Promops Gerv., (nec Spix) Expéd. du Comte de Castlenau, Zool. Mamm., II, 1855, p. 58, pl. XII. figs. 3, 3a. (text.) Type *Promops ursinus* Gervais = *Molossus nasutus* Spix.

Ears close together or united at base of their inner margins; muzzle broad, obtuse or obliquely truncate; lips smooth; tragus short; first and fifth toes thickest, long curved hairs on the back of all of them. Upper incisors, two in number, with their cusps close together in front.

KEY TO THE SPECIES.

	PAGE
A. Muzzle rounded in front.	
a. Antitragus circular.....	<i>P. nasutus</i> 621
b. Antitragus semi-oval.....	<i>P. abrasus</i> 623
c. Antitragus broader than high.....	<i>P. orthotis</i> 623
B. Muzzle obliquely truncate.	
a. Size large; above gray.....	<i>P. glaucinus</i> 624
b. Size small; above dark bistre, washed with drab.....	<i>P. nanus</i> 624

580. nasutus (*Molossus*), Spix, Sim. et Vesp. Bras., 1823, p. 60, pl. xxxv, fig. VII.

fumarius Spix, Sim. et Vesp. Bras., 1823, p. 60, pl. xxxv, figs. v, vi.

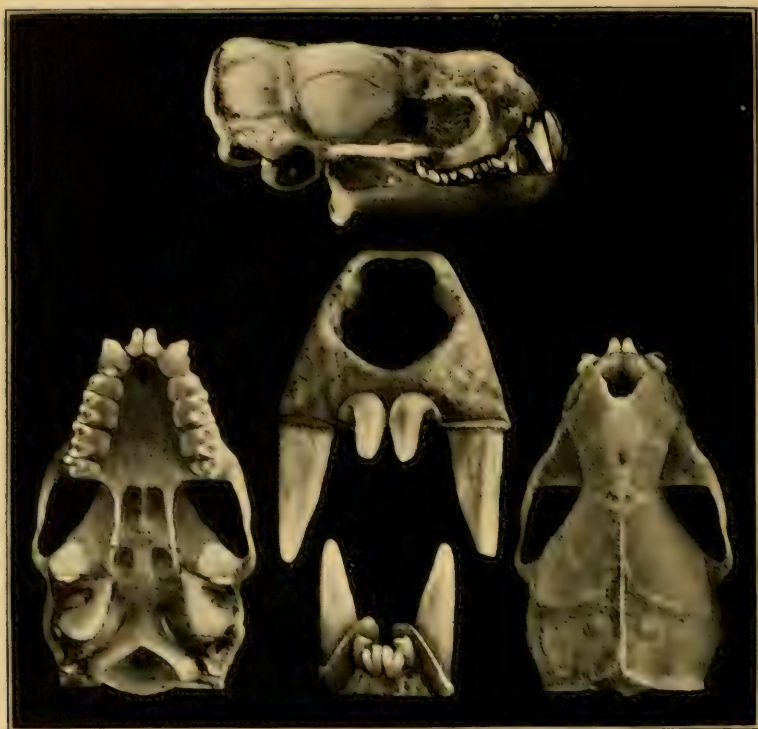
ursinus Gervais, Exped. Castlenau, Mamm., 1855, p. 59, pl. XII, figs. 3, 3a.

LARGE-NOSED MASTIFF BAT.

Type locality. Near the Rio San Francisco, Brazil.

Geogr. Distr. Guatemala, through Central America to Brazil, South America.

Genl. Char. Muzzle obtuse; patch of thick, short hairs on upper lip below nostrils; sides of muzzle nearly naked; ears shorter than head; inner margins uniting on the muzzle in a ridge; antitragus circular; tragus small with exterior basal projection; gular sac on male.

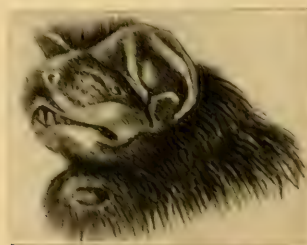
FIG. 123. *PROMOPS GLAUCINUS*.

U. S. Nat. Mus. Coll.

Twice nat. size. Nose view enlarged 5 times.

Color. Above dark brown, beneath paler; base of hairs whitish.

Measurements. Total length, 127.5; tail, 51; forearm, 50.8; thumb, 7.6; third finger, metacarpal, 52.7; fourth finger, 50.8; fifth finger, 25.0; tibia, 17.7; foot, 10; ear, 15.2; tragus, 2.

FIG. C. *PROMOPS NASUTUS*.

ex Dobson, Cat. Bats.

- 581. abrasus** (*Dysopes*), Temm., Mon. Mamm., 1, 1827, p. 232.
longimanus Wagn., Wieg. Archiv. f. Naturg., 1843, p. 367.
leucopleura Wagn., Wieg. Archiv. f. Naturg., 1843, p. 367.

SHAVED MASTIFF BAT.

Type locality. Brazil.

Geogr. Distr. Guatemala, Central America south to Brazil, South America.

Genl. Char. Muzzle extending beyond upper lip; edges of nostrils projecting laterally; lips without wrinkles, fringed with short hairs; gular sac on male; ears large, united anteriorly; antitragus convex; tragus square, angles rounded; wings from base of tibia.

Color. Above reddish brown; beneath paler; base of hairs buffy.

Measurements. Total length, 109.9; tail, 27.4; forearm, 62.2; thumb, 11.4; third finger, metacarpal, 51.8; fourth finger, metacarpal, 51.5; fifth finger, metacarpal, 25.9; foot, 10; ear, 20.3; tragus, 3.

- 582. orthotis** (*Nyctinomus*), H. Allen, Proc. Am. Phil. Soc., xxvi, 1889, p. 561.

STRAIGHT-EARED MASTIFF BAT.

Type locality. Island of Jamaica.

Genl. Char. Vertical ridge between nostrils absent, nostrils elliptical, slightly expanded above; upper border of muzzle not projecting, without pectinate spines, but furnished with papillæ extending over nostrils; ears united by a band and extending 4 mm. beyond muzzle; ear rounded, the outer border with a lap, in length one-half diameter of ear conch; antitragus thin, broader than high, with a fold of skin extending from it to the mouth; tragus quadrate similar to that of *N. brasiliensis*; stout bristles between ears and muzzle.

Color. Upper parts fawn color, fur paler at the base; under parts like back; face and ears dark chestnut.



FIG. CI. PROMOPS GLAUCINUS.
U. S. Nat. Mus. Coll.

Measurements. Total length, 93; tail (in membrane, 25, and free, 9), 34; forearm, 57; thumb, 5; second finger, metacarpal, 22; third finger, metacarpal, 25; first phalanx, 10; second phalanx, 9; fourth finger, metacarpal, 24; first phalanx, 10; second phalanx, 4; fifth finger, metacarpal, 12; first phalanx, 9; second phalanx, 3; tibia, 20; foot, 7; ear, 20.

583. glaucinus (*Dysops*), Wagn., Wieg. Archiv., f. Naturg., 1843, Pt. 1, p. 368.

ferox Gundl., Monatsb. K. Preuss. Akad. Wiss. Berl., 1861, p. 149.
CHESTNUT MASTIFF BAT.

Type locality. Cuyaba, Matto Grosso, Brazil.

Geogr. Distr. Island of Jamaica; in South America to Brazil and Bolivia.

Genl. Char. Ears united by their bases near the end of the nose; ear conch convex on both margins; tragus small with no lobe at base of outer margin; gular sac in male; wings from ankles.

Color. Above chestnut brown, tips of hairs grayish, base light brown; under parts paler.

Measurements. Total length, 131; tail, 54.6; forearm, 59.6; thumb, 8.8; third finger, 59.6; fourth finger, 57; fifth finger, 25.9; tibia, 20.3; foot, 12.7; ear, 22.8; tragus, 13.5. Skull: total length, 22; occipito-nasal length, 19; Hensel, 14; zygomatic width, 14; interorbital constriction, 5; palatal length, 8.5; length of upper molar series, 6.5; width of braincase, 11.5; length of mandible, 17; length of lower molar series, 8.

584. nanus (*Promops*), Miller, Ann. Mag. Nat. Hist., 7th Ser., vi, 1900, p. 470.

DWARF MASTIFF BAT.

Type locality. Bogava, Chiriqui, Panama. Altitude, 800 feet.

Genl. Char. Miniature of *P. glaucinus*. Canines not in contact with incisors; upper molar with a small distinct cusp.

Color. Above dark bistre washed with écreu drab; under parts broccoli brown washed with écreu drab; hairs at base smoky gray.

Measurements. "Total length, 75; tail, 34; tibia, 11; foot, 7.8; forearm, 38; thumb, 5.5; second digit, 38; third digit, 75; fourth digit, 58; fifth digit, 37. Skull: greatest length, 16.4; basal length, 15; basilar length, 13; median palatal length, 6; zygomatic breadth, 9.8; interorbital constriction, 3.6; mastoid breadth, 9; greatest breadth of braincase above roots of zygomata, 8; lachrymal breadth, 5; mandible, 11.6; maxillary tooth row (exclusive of incisor), 6.4; mandibular tooth row (exclusive of incisor), 6.8." (Miller, l. c.)

131. Nyctinomops.

$$I. \frac{1-1}{2-2}; C. \frac{1-1}{1-1}; P. \frac{1-1}{2-2}; M. \frac{3-3}{3-3} = 28.$$

Nyctinomops Miller, Proc. Acad. Nat. Scien. Phil., 1902, p. 393.

Type *Nyctinomus femorosaccus* Merriam.

"Externally like *Nyctinomus*. Skull like that of *Promops* except that the premaxillæ are separated in front by a very narrow space. Upper incisors parallel, the two occasionally in contact."



FIG. 124. NYCTINOMOPS YUCATANICUS.

No. 108162 U. S. Nat. Mus. Coll.

Enlarged $2\frac{1}{2}$ times. Nose view enlarged 7 times.

KEY TO THE SPECIES.

	PAGE
A. Ears large; lower incisors, 2-2.	
a. Upper parts dull brown; forearm, 46 mm. <i>N. femorosaccus</i>	626
b. Upper parts uniform Vandyke brown; forearm, 42 mm. <i>N. yucatanicus</i>	626
c. Upper parts dark brown; forearm, 45 mm. <i>N. gracilis</i>	626
d. Upper parts burnt umber; forearm, 60 mm. <i>N. depressus</i>	627
e. Upper parts reddish brown; forearm, 55 mm. <i>N. macrotis</i>	627

585. femorosaccus (*Nyctinomous*), Merr., N. Am. Faun., No. 2, 1889, p. 23.

PALM SPRINGS FREE-TAILED BAT.

Type locality. Agua Caliente, Palm Springs, Riverside County, California.

Geogr. Distr. Riverside County to Ensinada, Lower California, Mexico. Extent of dispersion unknown.

Genl. Char. Incisors $\frac{1-1}{2-2}$; lower incisors bifid and crowded, first upper premolar small; second with a very large and high antero-internal cusp; ears thick, keel greatly developed, with a large lobe on its lower third; antitragus higher than long, convex anteriorly, slightly concave posteriorly, and separated by a deep notch; tragus subquadrate; tail more than half exerted; gular sac present; wing membrane from below middle of tibia, and the fur extends out, above, and beneath, as far as a line drawn from the middle of the humerus to the junction of the middle and outer thirds of the femur. (Merr., l. c.)

Color. Dull brown.

Measurements. Total length, 114; tail, 44; foot, 11; ear from base of antitragus, 21; forearm, 46; tibia, 14; third finger, metacarpal, 45; first phalanx, 20; second phalanx, 17.5. Skull; total length, 19; Hensel, 15; zygomatic width, 11; interorbital constriction, 3.5; width of braincase over zygomata, 8.5; palatal length, 7.5; length of upper molar series, 5; length of lower molar series, 4.

586. yucatanicus (*Nyctinomops*), Miller, Proc. Acad. Nat. Scien. Phil., 1902, p. 393.

YUCATAN FREE-TAILED BAT.

Type locality. Chichen Itza, Yucatan.

Genl. Char. Similar to *N. europs*., but ear larger, and teeth larger; ear not thickened at edge; antitragus large, higher in proportion to its width than in *N. europs*.

Color. General hue uniform Vandyke brown, the under parts tinged with wood brown; ears and membranes dark brown.

Measurements. Total length, 98; tail, 42; forearm, 42; thumb, 8; second finger, 40; third finger, 81; fourth finger, 60; fifth finger, 42; tibia, 12.4; foot, 9; ear from meatus, 15; from crown, 11.6; width, 17; tragus, 1.8. Skull: greatest length, 17.2; basal length, 15; interorbital constriction, 3.4; zygomatic breadth, 10; breadth of braincase, above roots of zygomata, 8.8; mandible, 12.4; maxillary tooth row, 6.4; mandibular tooth row, 7.

587. gracilis (*Dysopes*), Wagn., Arch. f. Naturg., 1843, p. 368.

GRACEFUL FREE-TAILED BAT.

Type locality. Cuyaba, Matto Grosso, Brazil.

Geogr. Distr. Guatemala, through Central America to Brazil, South America.

Genl. Char. Ears united by a low band, antitragus as high as long; ears joined together only by the bases of their inner margins; tragus very small; lower incisors 2-2; no gular sac.

Color. Dark brown above and beneath extending on to wing membranes along side of body.

Measurements. Total length, 78.7; tail, 26.6; tail free from membrane, 17.7; forearm, 45.7; thumb, 7.6; third finger, metacarpal, 43; fourth finger, metacarpal, 41.9; fifth finger, metacarpal, 25.4; tibia, 12.7; foot, 8.8; tragus, 2.5.

588. depressus (*Nyctinomus*), Ward, Am. Nat., xxv, 1891, p. 747, fig.

macrotis nevadensis (*Nyctinomus*), H. Allen, Mon. N. Am. Bats, 1894, p. 171.

TUCUBAYA FREE-TAILED BAT.

Type locality. Tucubaya, Federal District, Mexico.

Geogr. Distr. Known only from the type locality.

Genl. Char. Ears large, outer margin bilobate; tragus straight; conch with seven diagonally transverse flutings; nostrils opening forward; five flutings on face extending to lip; furrow beneath eye; wing membrane from tibia and calcanea; outer edges of first and fifth toes fringed with short hairs; gular pouch absent. Upper incisors semi-conical, lower bifid; canines long; first premolars, above and below, smaller than second, and these larger than molars; cusps acute.

Color. Above burnt umber; beneath Prout's brown; base of hairs white.

Measurements. Total length, 79; tail vertebræ, 52; beyond inter-femoral membrane, 33; forearm, 60; thumb, 8; second finger, metacarpal, 55; third finger, metacarpal, 58; fourth finger, metacarpal, 56; fifth finger, metacarpal, 29; tibia, 18; foot, 13; ear, 25; tragus, 4.5.

589. macrotis (*Nyctinomus*), Gray, Ann. Nat. Hist., iv, 1839, p. 5.

auritus Natt., Wagn., Wieg. Archiv. f. Naturg., 1843, p. 368.

laticaudatus et *cæcus*, Rengg., Säugeth. Parag., 1830, p. 88.

aurispinosis Peale, U. S. Expl. Exp., VIII, 1844, p. 21.

CUBAN FREE-TAILED BAT.

Type locality. Cuba.

Geogr. Distr. Islands of Cuba and Jamaica, West Indies to Brazil and Paraguay.

Genl. Char. Ears thin; keel of ear conch slender, deep, bent

backward on itself; antitragus longer than high, separated by a deep notch; muzzle concave, no gular sac. Teeth slender, cusps acute.

Color. Reddish brown above and below.

Measurements. Total length, 79.2; tail, 25.4; forearm, 51.3; thumb, 7.6; third finger, 51.5; fourth finger, 50.8; fifth finger, 25.4; tibia, 41.9; foot, 10; ear, 25.4; tragus, 3.8.

132. *Nyctinomus*.

$I. \frac{1-1}{2-2}$, or $\frac{1-1}{3-3}$; $C. \frac{1-1}{1-1}$; $P. \frac{1-1}{2-2}$, or $\frac{2-2}{2-2}$; $M. \frac{3-3}{3-3} = 28$ or 32.

Nyctinomus Geoff., Descr., Égypte. Mamm., II, 1813, p. 114, pl. 2.

Type *Nyctinomus ægypticus* E. Geoffroy.

Dinops Savi, Nuov. Giorn. de Leth., 1825, p. 230.

Dysopes Cretzsch., Rupp. Atl. Reis. Nordl. Afr., Zoöl., 1826, p. 69. (nec Illig.)



FIG. 125. *NYCTINOMUS MEXICANUS*.

No. 7860 Field Columbian Mus. Coll.

Enlarged 3 times. Incisors enlarged 6 times.

Ears close together at base of inner margins; tragus short, rounded above; muzzle projecting beyond lower lip, broad, obliquely truncate; upper lip grooved with vertical wrinkles, expansible; first and fifth toes thickest; long curved hairs on back of all the toes; premaxillæ separate in front, or joined only by cartilage; upper incisor at base in contact with canine, the cusps converging inward and forward.

KEY TO THE SPECIES.

A. Upper lip with vertical wrinkles.

a. Forearm under 50 mm.	PAGE
a.' General color reddish brown..... <i>N. antillularum</i>	629
b.' Above Prout's brown..... <i>N. mexicanus</i>	629
c.' Above broccoli brown..... <i>N. bahamensis</i>	630
d.' Above seal brown..... <i>N. musculus</i>	630
b. Forearm under 30 mm..... <i>N. minutus</i>	630

590. antillularum (*Nyctinomus*), Miller, Proc. Acad. Nat. Scien. Phila., 1902, p. 398.

DOMINICAN FREE-TAILED BAT.

Type locality. Roseau, Island of Dominica.

Geogr. Distr. Islands of Dominica, Montserrat, St. Kitts, and St. Lucia.

Genl. Char. Size small. First lower molar minute and without distinct cingulum.

Color. Like *N. macrotis*, with red and brown phases.

Measurements. Total length, 83; tail vertebræ, 30; forearm, 47.4; thumb, 7; second finger, 38; third finger, 70; fourth finger, 58; fifth finger, 40; tibia, 12; foot, 6.6; ear from meatus, 15; from crown, 11.4; width, 15. Skull: greatest length, 16; basal length, 14.8; basilar length, 12; median palatal length, 6; interorbital constriction, 3.8; zygomatic breadth, 9; breadth of braincase above roots of zygomata, 8; mandible, 11; length of upper tooth row, 5.8; lower tooth row (both exclusive of incisors), 6.

591. mexicanus (*Nyctinomus*), Sauss., Rev. Mag. Zoöl., 2me Sér., XII, 1860, p. 283.

mohavensis Merr., N. Am. Faun., No. 2, 1889, p. 25.

MEXICAN FREE-TAILED BAT.

Type locality. Cofre de Perote, State of Vera Cruz, Mexico, 13,000 feet elevation.

Geogr. Distr. Volcano of Popocatepetl, through northern Mexico and the United States. Lower California.

Genl. Char. Ears square, extending beyond nose when turned forward, very large, rounded, with a well-defined vertical crest behind

the eye terminating in a curved line that joins the outer border; lower margin of ears wrinkled and carried nearly to the angle of the mouth; nostrils lateral; interfemoral membrane covered with gray hairs; wing membrane from tarsus; tail hidden in membrane for half its length. First premolar small.

Color. Above Prout's brown, beneath ashy brown.

Measurements. Total length, 83.5; forearm, 43; tail, 28.9; free portion, 20.3; thumb, 7.6; ear, 17.7; width of ears, 14. Skull: occipito-nasal length, 19; zygomatic width, 10; width of braincase, 9; palatal length, 9; upper tooth row, without incisors, 4.5; length of mandible, 11.

592. bahamensis (*Nyctinomus*), Rehn, Proc. Acad. Nat. Scien. Phila., 1902, p. 641.

BAHAMAN FREE-TAILED BAT.

Type locality. Governor's Harbor, Eleuthera Island, Bahamas.

Genl. Char. Central emargination of nose pad shallow; size large.

Color. Above broccoli brown, beneath drab gray.

Measurements. Total length, 91; forearm, 42; tail, 36.

593. musculus (*Nyctinomus*), Gundl., Monatsb. K. Preus. Akad. Wiss. Berl., 1861, p. 149.

FREE-TAILED MOUSE BAT.

Type locality. Cuba.

Geogr. Distr. Islands of Cuba, Porto Rico, St. Kitts, Trinidad.

Genl. Char. Similar to *N. mexicanus* but third finger shorter.

Color. Above seal brown, beneath hair brown.

Measurements. Total length, 86; tail vertebræ, 34; third finger, 68-77.

594. minutus (*Nyctinomus*), Miller, Bull. Am. Mus. Nat. Hist., 1899, p. 173.

brasiliensis Chapman, Bull. Am. Mus. Nat. Hist., 1892, p. 316.
(Part.)

LITTLE FREE-TAILED BAT.

Type locality. Trinidad, Island of Cuba.

Geogr. Distr. Island of Cuba.

Genl. Char. Smallest species of the genus; ears separate, pointed, slightly keeled; anterior edge of ear without horny excrescences; pad at base of thumb broad and conspicuous. Skull with short, broad rostrum, and conspicuous lachrymal processes; dental formula $I. \frac{1-1}{2-2}; C. \frac{1-1}{1-1}; P. \frac{1-1}{2-2}; M. \frac{3-3}{3-3} = 28$. (Miller, l. c.)

Color. Dull reddish brown, paler on belly.

Measurements. Total length, 74; tail vertebræ, 28; forearm, 29;

thumb, 6; second finger, 25; third finger, 56; fourth finger, 47; fifth finger, 33; tibia, 9; foot, 6; ear from crown, 10; tragus, 4. Skull: greatest length, 13.4; basal length, 12.6; basilar length, 10.4; zygomatic breadth, 8.6; width of braincase above roots of zygomatic, 7; interorbital constriction, 3.4; palatal length, 5; upper tooth row exclusive of incisors, 5; length of mandible, 9.6; lower tooth row without incisors, 6.

Fam. IV. **Natalidæ. Funnel-eared Bats.**

"Small; ears separated, shaped like a funnel; interior surface of conch smooth or papillose without cross striations; muzzle neither simple nor with leaf-like outgrowths; thumb variable, its phalanges sometimes rudimentary; metacarpal never wholly free from membrane; third manual digit normally with two phalanges, second longer than first. Skull: braincase abruptly elevated above face line; vomer large, generally fused with posterior edge of bony palate, the anterior extremity always produced as a median spicule appearing at bottom of anterior palatine emargination. Upper incisors four, each widely separated from each other and from canine. Lower incisors six, small; anterior premolars in both jaws large, laterally compressed, and with well-developed cutting edges; maxillary molars with inner side of crown narrow, the protocone well developed, but hypocone rudimentary or absent." (Miller.)

133. Natalis.

$$I. \frac{2-2}{3-3}, C. \frac{1-1}{1-1}, P. \frac{3-3}{3-3}, M. \frac{3-3}{3-3} = 38.$$

***Natalus** (*sic*) Gray, Mag. Zoöl. & Bot., II, 1838, p. 496. Type *Natalis stramineus* Gray.

Spectrellum Gerv., Expéd. Comte Casteln. l'Amér. Sud. Mamm., Zoöl., 1855, p. 51. *Id.* Compt. Rend. Acad. Scien., Paris, XLII, 1856, p. 550.

Crown elevated above forehead; muzzle lengthened; lower lip broad; surface of ear conch covered with papillæ, the outer margin ending between tragus and angle of mouth; thumb nearly hidden in antebrachial membrane; wing membranes from lower end of tibia; wing and interfemoral membranes with dotted lines over them; tail long, inclosed in interfemoral membrane; inner upper incisors diverge from the outer pair; first premolar equal to or larger than the second.

*The derivation of this word is not given, and *Natalus* does not appear in the dictionary. *Natalis* is a Roman surname; *Natalis*, adj., natal, or belonging to birth, may have been intended. *Natalus* is probably a misprint.



FIG. 126. NATALIS STRAMINEUS.
No. 1817 Coll. Acad. Nat. Scien., Phila.
Enlarged $3\frac{1}{2}$ times. Nose view enlarged 7 times.

KEY TO THE SPECIES.

		PAGE
A. Tragus broad, tip pointed.		
a. Total length, 93 mm.; forearm, 37.....	<i>N. stramineus</i>	632
b. Total length, 110 mm.; forearm, 43.....	<i>N. s. major</i>	633
c. Total length, 95 mm.; forearm, 35.....	<i>N. mexicanus</i>	633



FIG. CII. NATALIS STRAMINEUS.
ex Dobson, Cat. Chiroptera. Enlarged nearly $\frac{1}{2}$.

595. stramineus (*Natalus*!), Gray, Mag. Zoöl. & Bot., 11, 1838,
p. 496.

splendidus Wagn., Wieg., Arch. f. Naturg., 1845, p. 148.

STRAW-COLORED BAT.

Type locality. Unknown.

Geogr. Distr. Island of Dominica, West Indies; Guatemala, Central America, to Brazil, South America.

Genl. Char. Crown higher than face; nostrils oval, close together, opening downward; lower lip grooved in center, with naked cushion on each side; ears shorter than head; tragus broad at base, point acute.

Color. Above light brownish yellow; beneath paler.

Measurements. Total length, 94; tail, 49.5; forearm, 26.6; thumb, 3.8; third finger metacarpal, 26; fourth finger, metacarpal, 31.7; fifth finger, metacarpal, 31.7; tibia, 19; foot, 8.8; tragus, 4.5; ear, 15.2. Skull: greatest length, 17; basal length, 15.6; median palatal length, 8.8; interorbital constriction, 3.2; zygomatic breadth, 9.6; breadth of braincase, 7.8; mandible, 13; maxillary tooth row, 7.8; mandibular tooth row, 7.8.

a.—major (*Natalus!*), Miller, Proc. Acad. Nat. Scien. Phila., 1902, p. 398.

GREAT BAT.

Type locality. Savaneta, Island of Haiti.

Genl. Char. Similar to *N. stramineus*, but larger.

Color. Same as *N. stramineus*.

Measurements. Total length, 110–116; tail vertebræ, 61–63; forearm, 42–43; thumb, 6; second finger, 43–44; third finger, 80–82; fourth finger, 61–62; fifth finger, 57–58; tibia, 22.4–23; foot, 9–9.8; ear from meatus, 15–16.6; from crown, 12. Female is the larger. Skull: greatest length, 18; basal length, 16.4; palatal length, 9.8; breadth of rostrum at base of canines, 4.4; interorbital constriction, 3.6; zygomatic breadth, 9.6; breadth of braincase, 9; mandible, 14; maxillary tooth row, 8; mandibular tooth row, 8.4.

596. *mexicanus* (*Natalus!*), Miller, Proc. Acad. Nat. Scien. Phila., 1902, p. 399.

SANTA ANITA BAT.

Type locality. Santa Anita, Lower California, Mexico.

Genl. Char. Smaller than *N. stramineus*. Skull has a smaller braincase and a more tapering rostrum anteriorly.

Color. Two color phases, a yellow and a brown. The former is a uniform ochraceous, slightly washed on the back with clay color; the latter is broccoli brown, paler on the under parts.

Measurements. Total length, 95; tail, 53; forearm, 35.4; thumb, 5; second finger, 37; third finger, 77; fourth finger, 56; fifth finger, 57; tibia, 19; foot, 7.6; ear from meatus, 14; from crown, 12. Skull: greatest length, 16; basal length, 14; zygomatic breadth, 8; interorbital constriction, 3; width of braincase above roots of zygomata, 7.6; mandible, 12; maxillary tooth row, 7; mandibular tooth row, 7.

134. Nyctiellus.

$$I. \frac{2-2}{3-3}; C. \frac{1-1}{1-1}; P. \frac{3-3}{3-3}; M. \frac{3-3}{3-3} = 38.$$

Nyctiellus Gerv. Expéd. du Comte de Castelnau, Amér. Sud. Mamm., 1855, p. 84, Plate xv, fig. 6. Type *Vespertilio lepidus* Gervais.

First premolar minute; crown elevated, highest at posterior margin; rostrum broad and lengthened; thumb prominent; wing membrane from near ankle, and with the interfemoral membrane, is covered with dotted lines similar to those of *Natalis*. Legs only as long as body; tail long, wholly inclosed in interfemoral membrane; inner pair of upper incisors diverge from outer pair, their tips pointing inward and nearly touching.



FIG. 127. NYCTIELLUS LEPIDUS.

No. 103898 U. S. Nat. Mus. Coll.

Enlarged $2\frac{1}{2}$ times. Face view enlarged 7 times.

597. lepidus (*Vespertilio*), Gerv., in Ramon de la Sagra, Hist. de l'isle de Cuba, Mamm., 1838, p. 22, pl. 1, figs. 1-4.

barbatus Gundl., Wiegmann, Archiv. f. Naturg., 1840, p. 356.

macrurum Gerv., Compt. Rend. Acad. Scien., Paris, 1856, p. 547.

GRACEFUL BAT.

Type locality. Cuba.

Geogr. Distr. Island of Cuba; Isle of Pines.

Genl. Char. Size very small; inner side of conch convex forward, tip rounded slightly, the margin convex on lower half, concave for remainder; tragus triangular with a small lobe at base and ending above in a lengthened narrow spur on inner margin; ears moderate, their lower halves hidden in fur.

Color. Above mummy brown, base of fur pale cinnamon; be-

neath pinkish buff; ears, wing, and interfemoral membranes pale brown.

Measurements. Total length, 60; forearm, 30; longest finger, 45; tail, 26; tibia, 14; ear, 10. (Skin.) Skull: occipito-nasal length, 12; greatest length, 13; Hensel, 10.5; zygomatic width, 5; interorbital constriction, 2.5; palatal length, 5.5; length of upper molar series, 4; length of mandible, 9; length of lower molar series, 4.2.

135. *Chilonatalis*.

$$I.\frac{2-2}{3-3}; C.\frac{1-1}{1-1}; P.\frac{3-3}{3-3}; M.\frac{3-3}{3-3} = 38.$$

Chilonatalus (*sic*) Miller, Proc. Acad. Nat. Scien. Phil., 1898, p. 326. Type *Natalus! micropus* Dobson.

Dermal outgrowths on chin and above nostrils conspicuous; glandular swelling on forehead of males between eyes.



FIG. 128. *CHILONATALIS BREVIMANUS*.

No. 37779 U. S. Nat. Mus. Coll.

2½ times nat. size. Face enlarged 7 times.

KEY TO THE SPECIES.

	PAGE
A. Frontal gland on forehead between the eyes.	
a. Upper parts chestnut brown; forearm, 33 mm. <i>C. micropus</i>	635
b. Upper parts paler; forearm, 31 mm. <i>C. brevimanus</i>	636
c. Upper parts cream buff; forearm 32 mm. . . <i>C. tumidifrons</i>	637

598. *micropus* (*Natalus!*), Dobson, Proc. Zool. Soc., 1880, p. 443.

SMALL-FOOTED BAT.

Type locality. Environs of Kingston, Island of Jamaica.

Geogr. Distr. Known only from type locality.

Genl. Char. Tip of ear conch rounded, the inner margin projects to end of muzzle; lower lip with a small horizontal cutaneous projection beneath; wings from lower third of tibia; foot very small; small wart-like process covered with hairs above nostrils.

Color. Above pale yellowish brown at base, rest chestnut brown; under parts uniform yellowish brown.

Measurements. Total length, 73.6; tail, 46.9; forearm, 33; thumb, 3.8; third finger, metacarpal, 26.6; fourth finger, metacarpal, 25.6; fifth finger, metacarpal, 26.6; tibia, 16.5; foot, 6.3. Skull: occipito-nasal length, 13; Hensel, 17; zygomatic width, 6; interorbital constriction, 3; length of rostrum, 5; height of braincase above auditory meatus, 6; width of braincase, 6; palatal length, 7; length of mandible, 10.5.



FIG. CIII. *CHILONATALIS BREVIMANUS*.
No. 15821 U. S. Nat. Mus. Coll. Twice nat. size.

599. brevimanus (*Chilonatalus*!), Miller, Proc. Acad. Nat. Scien. Phil., 1898, p. 328.

micropus Allen, Bull. Am. Mus. Nat. Hist., N. Y., 1890, p. 169.
(nec Dobson.)

SHORT-FINGERED BAT.

Type locality. Old Providence Island, Carribean Sea.

Genl. Char. Smaller than *C. micropus* Dobson, but ears longer and fingers shorter.

Color. Similar to *C. micropus*, but paler, possibly the result of long immersion in alcohol.

Measurements. Total length, 81-90; tail vertebræ, 44-49; forearm, 31-33.4; thumb, 3.8-4; longest finger, 57; tibia, 15-15.6; foot, 6-7; ear, 13-14.4; tragus, 4-5.

600. tumidifrons (*Chilonatalus*!), Miller, Proc. Biol. Soc. Wash., xvi, 1903, p. 119.

WATLING'S ISLAND BAT.

Type locality. Cave near Sandy Point, at the southwest corner of Watling's Island, Bahamas.

Genl. Char. Frontal gland extending from middle of forehead nearly to end of muzzle and rising 5 mm. above level of eye. Skull and teeth essentially as in *C. micropus*.

Color. Cream buff clouded on the upper parts with broccoli brown; ears light yellowish brown, edges darker; membranes dark brown.

Measurements. Total length, 87; head and body, 40; tail, 47; tibia, 18; foot, 7; forearm, 32; thumb, 5; second finger, 34; third finger, 65; fourth finger, 48; fifth finger, 49; ear from meatus, 14; from crown, 11; width, 16. Skull: greatest length, 15.8; basal length, 14; basilar length, 13; zygomatic breadth, 7.4; greatest breadth of braincase, 6.6; mandible, 11.4; maxillary tooth row exclusive of incisors, alveolar border, 6.8; mandibular tooth row exclusive of incisors, alveolar border, 7.

136. Thyroptera.

$$I. \frac{2-2}{3-3}, C. \frac{1-1}{1-1}, P. \frac{3-3}{3-3}, M. \frac{3-3}{3-3} = 38.$$

Thyroptera Spix, Simiar. et Vespert. Brasil., 1823, p. 61. Type *Thyroptera tricolor* Spix.

Hyonycteris Licht. & Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1854, p. 335.

Size small; tail long; wing membrane from ankle, very thin; calcar very short; no nose-leaf; muzzle lengthened; crown elevated; base of thumbs and soles of feet with hollow suction disks; tail extending slightly beyond interfemoral membrane; middle finger with three phalanges.

601. discifera (*Hyonycteris*), Licht. & Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1854, p. 336. Miller, Proc. Biol. Soc. Wash., x, 1896, p. 109.

DISK-BEARING BAT.

Type locality. Puerto Caballos, District of Cortez, Honduras, Central America.

Geogr. Distr. Honduras, south to South America.

Genl. Char. Size very small; ear small, funnel-shaped, much hid-

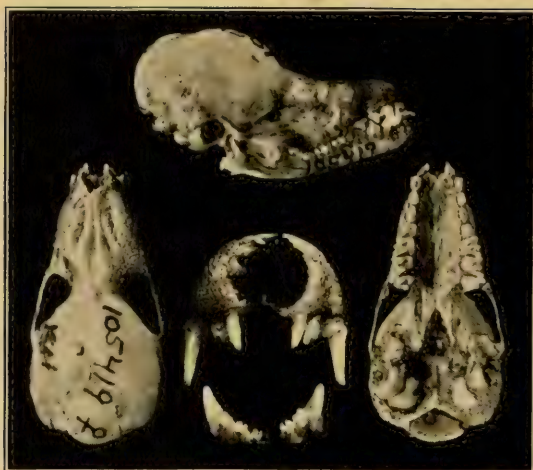


FIG. 129. THYROPTERA DISCIFERA.

No. 105419 U. S. Nat. Mus. Coll.

2½ times nat. size. Face enlarged 7 times.

den in fur; tips pointed, lower two-thirds of outer margin convex, terminating midway between tragus and angle of mouth; upper portion of outer margin concave; "tragus short, with a prominent lobule opposite the base of its inner margin directed forward, abruptly narrowed in upper third, very acutely pointed and curved inward"; deep pit between nostrils; lower lip with groove on each side inclosing an angular cushion; wing membrane to ankles; a circular hollow disk on ball of thumb and another smaller one on sole of the foot; upper incisors directed forward and inward, bifid; lower incisors trifid; canines small; the first upper premolar smaller than second, and first lower premolar also smaller than second but larger than canine; middle lower molar largest.



FIG. CIV. THYROPTERA DISCIFERA.

No. 102923 U. S. Nat. Mus. Coll.

Color. Above reddish brown, under parts pale yellowish white; membranes dark brown.

Measurements. Total length, 68.5; forearm, 38; third finger, 35.5; fourth finger, 35.5; fifth finger, 30.4; tibia, 17.7; tail, 25.4; free portion, 7.6; ear, 12.7; tragus, 4.5. Skull: occipito-nasal length, 13; Hensel, 11.5; zygomatic width, 6; interorbital constriction, 2; palatal length, 6.2; height of braincase, above zygomata, 5; length of upper tooth row, 5; length of mandible, 11.2; length of lower molar series, 5.

The Bats of the next family gained their trivial name not so much for any especially bad habits the majority may have possessed, but on account of the blood-sucking propensities of the Desmodontine section. Indeed, some of the species are far removed from the ranks of the Vampires and are insect-eaters, while a large number live on both insects and fruit. The species of the various genera differ widely in their appearance, some of them with their large ears and exaggerated cutaneous appendages presenting very extraordinary visages. The color of their fur is dull in hue, and some species are marked with white streaks. The blood-sucking members are modified in body and teeth to adapt them more perfectly for their nefarious practices. The Vampire group in this volume ends with the genus *Hemiderma*.

Fam. V. **Phyllostomatidae. Vampire Bats.**

Cutaneous processes surrounding or close to the nasal apertures; ears moderately large, tragi well developed; middle finger with three phalanges, index-finger with one phalanx; premaxillæ united; tail variable, either well developed or absent; eyes large.

Subfam. I. **Mormopinæ.**

137. Chilonycteris.

$$I. \frac{4-4}{4-4}; C. \frac{1-1}{1-1}; P. \frac{2-2}{3-3}; M. \frac{3-3}{3-3} = 42.$$

Chilonycteris Gray, Ann. Nat. Hist., or Mag. Zoöl. Bot. Geol., iv, (1839), p. 4. Type *Chilonycteris macleanyi* Gray.

Lobostoma Gundl., in Wieg., Archiv. f. Naturg., I, 1840, p. 356.

Phyllodia Gray, Proc. Zoöl. Soc., 1843, p. 50.

Muzzle broad; nostrils close together; lower lip folded outward with numerous papillæ in front; ears broad at base, attenuate towards tip; tragus longer than broad, with lobule at center of the

margin; upper middle incisor larger than outer, edges notched; wing membrane joined to extremity of calcaneum and from the tibia; tail perforating the interfemoral membrane and appearing above; membrane large, calcanea long.

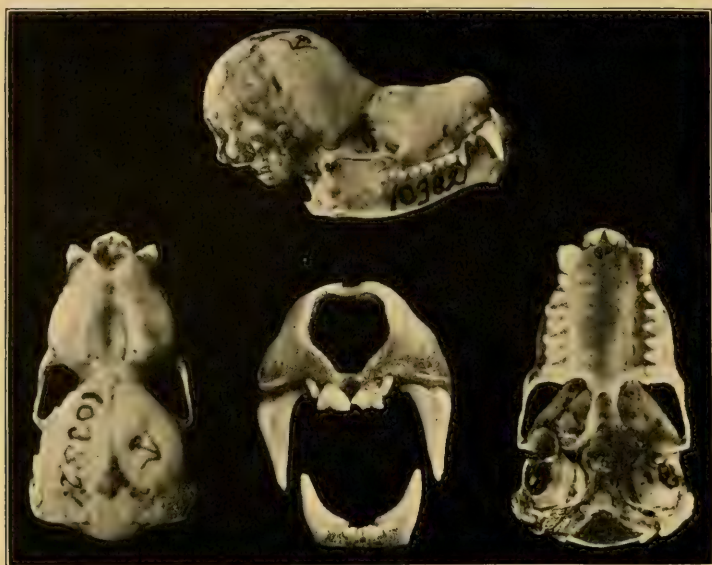


FIG. 130. CHILONYCTERIS BOOTHI.

No. 10382 U. S. Nat. Mus. Coll.

3 times nat. size. Nose enlarged 6 times.

KEY TO THE SPECIES.

A. Wings from the sides of the back.

a. Forearm under 50 mm.

a.' Tooth-like projection from margin of nostril.....*C. macleayi* 641

b.' No tooth-like projection from margin of nostril.

a." Above dark brown, paler beneath.....*C. personata* 641

b." Above dark orange, beneath paler orange.....*C. psilotis* 642

b. Forearm over 50 mm.

a.' Conical projection on muzzle above.

a." First lower premolar in contact with third.....*C. parnelli* 642

b." First lower premolar not in contact with third.

a. "' Ear from meatus, 23-24 mm.	<i>C. boothi</i>	642
b. "' Ear from meatus, 19-21 mm.	<i>C. portoricensis</i>	643
b. ' Rounded projection on muzzle above.		
a. " Size large; total length, 91.25 mm.; above dark brown.	<i>C. rubiginosa</i>	643
b. " Size small; total length, 81 mm.; above broccoli brown.	<i>C. mexicana</i>	644



FIG. CV. CHILONYCTERIS MACLEAYI.

No. 102483 U. S. Nat. Mus. Coll. About nat. size.

602. macleayi (*Chilonycteris*), Gray, Ann. Mag. Nat. Hist., or Mag.

Zoöl. Bot. Geol., IV, 1839, p. 5, pl. 1, fig. 2.

quadridens Gundl., in Wiegman, Archiv. für. Naturg., 1840, p. 357.**fuliginosa* Gray, Proc. Zoöl. Soc., 1843, p. 20.**grisea* Gosse, Nat. Sojourn in Jamaica, 1851, p. 326, pl. IV, fig. 1.

MACLEAY'S BAT.

Type locality. Cuba.*Geogr. Distr.* Islands of Cuba, Haiti, and Jamaica, West Indies.*Genl. Char.* Wings from sides of back; lower third of ear conch separated by a right-angled notch from upper portion; outer margin convex, forming an acute-angled notch; upper margin of nostrils with tooth-like projection.*Color.* Rufous phase: upper parts mars brown suffused with burnt umber on back; beneath fawn. Brown phase: above sepia, paler on head and neck; beneath pale isabella, basal portion of fur seal brown. Membranes from Vandyke brown to black.*Measurements.* Total length, 59-65; tail, 18-20; forearm, 41.9; thumb, 6.3; third finger, metacarpal, 36.8; fourth finger, metacarpal, 33; fifth finger, metacarpal, 29.2; tibia, 15.2; foot, 8.3; ear, 16; tragus, 5.**603. personata** (*Chilonycteris*), Wagn., Archiv. für Naturg., 1843, p. 367.

MASKED BAT.

Type locality. Mato Grosso, Brazil.*Geogr. Distr.* Guatemala, Central America, to Brazil, South America.

*Mr. J. A. G. Rehn considers these valid subspecies. See Appendix, p. 747.

Genl. Char. No cutaneous projection from upper margin of nostrils: a right-angled notch at the junction of lower two-thirds and upper one-third of the margin of ear conch.

Color. Above dark brown, beneath paler.

Measurements. Total length, 52.8; tail, 17.7; forearm, 44.4; ear, 15.

- 604. psilotis** (*Chilonycteris*), Dobson, Cat. Chirop. Brit. Mus., 1878, p. 451, pl. XXIII, fig. 2. Miller, Proc. Biol. Soc. Wash., 1902, p. 249.

SHAGGY-EARED BAT.

Type locality. Unknown.

Geogr. Distr. Isthmus of Tehuantepec, Mexico; range unknown.

Genl. Char. Outer side of ear without notch, margin almost straight, and no projections from upper margins of nostrils.

Color. General hue orange, palest on under parts.

Measurements. Total length, 62; tail, 16; tibia, 17; foot, 9; forearm, 44; thumb, 8; second finger, 37; third finger, 71; fourth finger, 50; fifth finger, 47; ear from meatus, 15.8; from crown, 11.4; width of ear, 7. Skull: greatest length, 15; basal length, 12.0; basilar length, 11.6; zygomatic breadth, 8.2; breadth of braincase above roots of zygomata, 8.

- 605. parnelli** (*Phyllostoma*), Gray, Proc. Zool. Soc., 1843, p. 50.
osburni Tomes, Proc. Zool. Soc., 1861, p. 66, pl. XIII.

PARNELL'S BAT.

Type locality. Island of Jamaica.

Geogr. Distr. Island of Jamaica.

Genl. Char. Size large; inner margin of ear conch convex, outer margin with an obtuse angled notch on lower two-thirds; conical elevation on muzzle; membranes nearly naked; no projection from margin of nostrils; first lower premolar in contact with third.

Color. Above dark grayish brown; beneath ashy.

Measurements. Total length of head and body, 58; forearm, 53; thumb, 6.3; third finger, metacarpal, 27.4; fourth finger, metacarpal, 41.9; fifth finger, metacarpal, 41.9; tibia, 17.7; foot, 11.4; ear, 19.

- 606. boothi** (*Chilonycteris*), Gundl. & Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1861, p. 154.

BOOTH'S BAT.

Type locality. Fundador, Island of Cuba.

Genl. Char. Similar to *C. parnelli*, but first lower premolar not in contact with the third; ears broad, pointed.

Color. Above light gray, base of fur dark; beneath lighter; throat and abdomen yellowish; bare part of face reddish; wing membrane blackish brown; bristles on nose white.

Measurements. Total length, 76.7; tail vertebræ, 15.2; forearm, 52; longest finger, 88-90; thumb, 8-8.5; tibia, 20-21; foot, 12. Skull: occipito-nasal length, 13; Hensel, 10; zygomatic width, 7; interorbital constriction, 3; palatal length, 5; height of braincase at bullæ, 7; length of upper molar series, 4.

607. portoricensis (*Chilonycteris*), Miller, Proc. Acad. Nat. Scien. Phil., 1902, p. 400.

PORTO RICAN BAT.

Type locality. Cave near Pueblo Viejo, Island of Porto Rico.

Genl. Char. Similar to *C. boothi*; ears smaller.

Color. Above dark brown; beneath broccoli brown washed with écu drab; ears and membranes blackish brown.

Measurements. Total length, 92; tail, 22; forearm, 51.4; thumb, 8; second finger, 42; third finger, 85; fourth finger, 58; fifth finger, 58; tibia, 18.8; foot, 10; ear from meatus, 20. Skull: greatest length, 20; basal length, 18.6; interorbital constriction, 4; lachrymal breadth, 7.4; zygomatic breadth, 11; mandible, 15; maxillary tooth row, 8.8; mandibular tooth row, 9.

608. rubiginosa (*Chilonycteris*), Wagn., in Wiegmann, Archiv. für Naturg., IX, bd. 1, 1843, p. 367.

DARK BROWN BAT.

Type locality. Caicara, Brazil.

Geogr. Distr. States of Vera Cruz and Michoacan, Mexico, south to Brazil.

Genl. Char. Pelage thin; ear naked, inner margin of conch convex, outer side emarginate; cutaneous process on muzzle only slightly elevated, with a low ridge placed at right angles; inner incisors trifold, outer bifid.

Color. Above dark brown, beneath pale grayish brown; ears and membranes pale brown; wing and interfemoral membranes edged with whitish; ears at base whitish.

Measurements. Total length, 91.7; tail vertebræ, 25.4; thumb, 6.3; forearm, 12.2; third finger, metacarpal, 50.8; fourth finger, metacarpal, 50.8; fifth finger, metacarpal, 48.2; tibia, 20.3; foot, 11.4; ear, 23.5; tragus, 7.6. Skull: greatest length, 22; basilar length, 19; interorbital constriction, 4.4; lachrymal breadth, 8.6; zygomatic breadth, 13; mandible, 17; maxillary tooth row, 10; mandibular tooth row, 11.

609. mexicana (*Chilonycteris*). Miller, Proc. Acad. Nat. Scien. Phila., 1902, p. 401.

MEXICAN BAT.

Type locality. San Blas, Territorio de Tepic, Mexico.

Geogr. Distr. Central and southern Mexico from State of Durango through Province of Tepic on the west, and States of Jalisco, Colima, and Morelos, to State of Oaxaca in the south.

Genl. Char. Similar to *C. rubiginosa*, but smaller in size and paler in color.

Color. Two phases. Upper surface dark broccoli brown; under parts pale wood brown; ears and membranes dark brown. This is the brown phase. The yellow phase has the entire head and body tawny ochraceous, with the hairs on belly dull brown at base.

Measurements. Total length, 82; tail, 20; forearm, 54; thumb, 7; second finger, 45; third finger, 90; fourth finger, 71; fifth finger, 67; tibia, 19.4; foot, 11.6; ear from meatus, 21. Skull: greatest length, 20; basal length, 19; basilar length, 17; interorbital constriction, 4.4; lachrymal breadth, 7.8; zygomatic width, 11.8; length of mandible, 15; upper tooth row, without incisors, 9; lower tooth row without incisors, 9.4.

138. *Dermonotus*.

$$I. \frac{4-1}{1-4}; C. \frac{1-1}{1-1}; P. \frac{2-2}{3-3}; M. \frac{3-3}{3-3} = 42.$$

Dermonotus Gill, Proc. Biol. Soc. Wash., XIV, 1901, p. 177. Type

Pteronotus davyi Gray.

Pteronotus Gray, Mag. Zoöl. Bot., II, 1838, p. 500. (nec Rafn.)

Wings from the spine; otherwise like *Chilonycteris*.

610. davyi (*Pteronotus*), Gray, Mag. Zoöl. Bot., II, 1838, p. 500.

DAVY'S BAT.

Type locality. Island of Trinidad.

Geogr. Distr. Islands of Dominica and Trinidad, south to Brazil.

Genl. Char. Back behind shoulders naked; wings from the middle of the tibia and from the calcanea; outer side of ear with obtuse notch; obtuse process from front of muzzle on each side.

Color. Two phases; one reddish brown, the other fulvous chestnut.

Measurements. Total length, 76.2; tail, 25.8; forearm, 47; thumb, 6.3; third finger, metacarpal, 42; fourth finger, metacarpal, 35.5;

FIG. 131. *DERMONOTUS DAVYI*.

No. 2324 Am. Mus. Nat. Hist. Coll.

3 times nat. size. Nose enlarged 8 times.

fifth finger, metacarpal, 33; tibia, 17.7; foot, 10; ear, 15.2; tragus, 5. Skull: occipito-nasal length, 15; Hensel, 11; zygomatic width, 8; interorbital constriction, 3; width of braincase, 7.5; palatal length,

FIG. CVI. *DERMONOTUS DAVYI*.

No. 2324 Am. Mus. Nat. Hist. Coll. Nearly twice nat. size.

5.5; length of upper molar series, 4; length of mandible, 11; length of lower molar series, 4.5.

a.—fulvus (*Chilonycteris*), Thomas, Ann. Mag. Nat. Hist., 6th Ser., x, 1802, p. 410.

LAS PEÑAS BAT.

Type locality. Las Peñas, State of Jalisco, Mexico.

Genl. Char. Smaller than *D. davyi*, but brighter colored. Skull small, narrow.

Color. Brilliant fulvous chestnut.

Measurements. Total length, 60-64; tail vertebrae, 20-21; forearm, 42-43; longest finger, 73-74; thumb, 6.5-7; tibia, 16-18; foot, 10.

The members of the next genus, *Mormops*, are remarkable for the peculiar formation of the skull, the forehead being highly elevated at almost a right angle to the face, presenting a unique appearance. Four forms are found within the limits covered by this work, and one is extra-limital, Island of Curaçoa.

139. *Mormops*.

$$I. \frac{4-1}{1-1}; C. \frac{1-1}{1-1}; P. \frac{2-2}{3-3}; M. \frac{3}{3} \frac{3}{3} = 42.$$

J. A. G. Rehn, *A revision of the Genus Mormoops (sic)*, Proc. Acad. Nat. Scien. Phil., 1902, p. 100.

Mormoops (*sic*) Leach, Trans. Linn. Soc., xiii,* 1820, p. 76. Type *Mormoops! blainvillii* Leach.

Crown elevated high above line of face; nostrils destitute of cutaneous appendages and directed downward; ears close together, sometimes united by prolongations from the muzzle on their inner margins; cutaneous processes on chin and sides of lips.

KEY TO THE SPECIES AND SUBSPECIES.

A. Chin pad divided deeply.

- | | | |
|---|------------------------|----------|
| a. Second upper premolar broad as long; internal lobe moderately developed. | <i>M. megalophylla</i> | PAGE 648 |
| b. Second upper premolar broader than long; internal lobe much developed. | <i>M. m. senicula</i> | 648 |

*Miller & Rehn in their List, p. 277, give the date of this publication as 1822; Rehn in his Review of the genus, l. c. p. 160, gives it as 1820, and Palmer in his Index Gen. Mamm., as 1821. The paper was read before the Society the 24d February, 1820, and it is reasonable to believe it was published in that year.



FIG. 132. MORMOPS MEGALOPHYLLA.

No. 80 Field Columbian Mus. Coll.

Enlarged 3 times. Incisors enlarged 8 times.

B. Chin pad slightly divided.

- | | | |
|--|-------------------------|----------|
| a. First upper premolar thickest in middle, the tooth with a rhomboid outline | <i>M. blainvillii</i> | PAGE 649 |
| b. First upper premolar thickest posteriorly, the tooth with a subconoid outline | <i>M. b. cinamomosa</i> | 649 |

611. megalophylla (*Mormops*), Peters, Monatsb. K. Preuss. Akad. Wiss., Berl., 1864, p. 381.

BIG-EARED BAT.

Type locality. Mexico.

Geogr. Distr. Islands of Cuba and Jamaica; eastern and southern Mexico to Brazil.

Genl. Char. Ear broad as high, tip rounded; extremity of muzzle truncate; lower jaw projecting slightly beyond the upper; wings from inferior surface of tibia; interfemoral membrane extending beyond tail; tibia long.

Color. Dark reddish brown above and beneath.

Measurements. Length of head and body, 74.7; forearm, 54; tibia, 21.5; foot, 10. "Skull: greatest length, 14.6; basal length, 14.6;

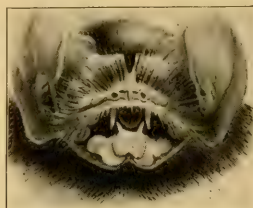


FIG. CVII. MORMOPS MEGALOPHYLLA.
ex Dobson, Cat. Chiroptera. $1\frac{1}{2}$ nat. size.

palatal length, 8.4; least interorbital breadth, 5; lachrymal breadth, 7; zygomatic breadth, 9.2; mastoid breadth, 8.6; breadth of brain case, 8.8; mandible, 12.8."

a.—senicula (*Mormoops!*), Rehn. Proc. Acad. Nat. Scien. Phila., 1902, p. 169.

megalophylla Mearns, Proc. Biol. Soc. Wash., XIII, 1900, p. 166.
(nec Peters.)

ANTIQUE BAT.

Type locality. Fort Clark, Kinney County, Texas.

Geogr. Distr. Southern Texas, into northern and central Mexico, to State of Morelos.

Genl. Char. Second upper premolar broad and heavy with a well-developed internal lobe.

Color. Above broccoli brown suffused with silver; nape and upper part of head lighter (pale écru); beneath wood brown, sides and flanks écru; membranes hair brown.

Measurements. Total length, 90; tail vertebræ, 28; expanse of wings, 373; longest finger, 90; forearm, 56. Skull: average of four

specimens: total length, 15; zygomatic width, 9.6; interorbital constriction, 5.4; palatal length, 8.

612. blainvillii (*Mormoops*?), Leach, Trans. Linn. Soc., XIII, 1820, p. 77, pl. VII, figs. 1-4.

DE BLAINVILLE'S BAT.

Type locality. Island of Jamaica.

Geogr. Distr. Islands of Cuba and Jamaica.

Genl. Char. Similar to *M. megalophylla*, but smaller, and the ears are united near the end of the muzzle; tragus triangular, its termination not rounded, and with a round process at base; wart behind eye; ear conch notched near muzzle; two fleshy processes on sides of upper lip, which is notched near angle of mouth where a deep lobe projects forward.

Color. Dark orange brown; under parts bright orange. (ex topotype, Kingston, Jamaica.)

Measurements. Total length, 78.3; tail, 28.3; forearm, 44.5; thumb, 6.2; third finger, 4.3; fourth finger, 3.8; fifth finger, 2.7.9; tibia, 2.0; foot, 8; ear, 13.9; tragus, 6.3.

a.—cinnamomea (*Lobostoma*), Gundlach, in Wiegmann, Archiv. für Naturg., VI, bd. I, 1840, p. 357.

CINNAMON BAT.

Type locality. Cafetal San Antonio el Fundador, Cuba.

Geogr. Distr. Islands of Cuba, Haiti, and Mona.

Genl. Char. Similar to *M. blainvillii*, but first upper premolar different in shape.

Color. Above walnut brown, beneath écru drab; ears and membranes blackish brown.

Measurements. Total length, 51.2; head, 16.8; forearm, 44.5; thumb, 6.6; third finger, 8.3.1; tibia, 19.5; calcaneum, 19.4; foot, 8.5; tail, 25.8; ear, 15; tragus, 4.4. Skull: average of two specimens, total length, 13.5; zygomatic width, 8.8; interorbital width, 4.2; palatal length, 8.

Subfam. II. Phyllostomatinae.

140. Lonchorina.

$$I. \frac{4-4}{4-4}, C. \frac{1-1}{1-1}, P. \frac{2-2}{3-3}, M. \frac{3-3}{3-3} = 42.$$

Lonchorina Tomes, Proc. Zool. Soc., 1863, p. 81, pl. 12. Type *Lonchorina aurita* Tomes.

Top of head elevated, face depressed; posterior lanceolate face

leaf very long, pointed, and with distinct mid rib; nostrils situated in a pit divided by a ridge, with a trifoliate fleshy excrescence between them; lower lip with a smooth triangular space; wing membrane to end of tibia; tail extending the length of the interfemoral membrane.



FIG. 133. LONCHORINA AURITA.
ex Dobson, Cat. Chiroptera. Nat. size.

613. aurita (*Lonchorina*), Tomes, Proc. Zool. Soc., 1863, p. 83.
TOMES' LONG-EARED BAT.

Type locality. West Indies; island unknown.

Genl. Char. Lance-shaped nose-leaf greatly developed; ears as long as head, broad, pointed; tragus tapering, subacute, half as long



FIG. CVIII. LONCHORINA AURITA.
ex Dobson, Cat. Chiroptera.

as ear, with an obtuse angle near base with a notch above it; wing membrane attached to *os calcis*; feet large, claws long, hooked; middle upper incisors flat, pointed; lateral ones minute, with a basal posterior lobe; canines small; anterior premolar small with two cusps; second premolar prominent; lower canines with a cingulum, as has also the second premolar.

Color. Above light reddish brown; beneath paler.

Measurements. Total length, 116.8; tail, 55.8; forearm, 50.8;

longest finger, 45.7; foot, 12.7; ear, 29.2; tragus, 17.7; nose-leaf, 26.6. Skull: total length, 24; interorbital constriction, 11; length of upper tooth row, 10; of mandible, 15.

The members of the genus *OTOPTERUS* are among the large species of the moderate sized bats, and are conspicuous for their huge ears. They are not over-particular as to their diet, and eat insects, fruits, and small bats when they can get them. They can rise into the air from a horizontal surface, a feat quite impossible to many species of other genera, and if they take up their abode in a house, it is said they always select the cellar, never the roof.

141. *Otopterus*.

$$I. \frac{2-2}{2-2}; C. \frac{1-1}{1-1}; P. \frac{2-2}{3-3}; M. \frac{3-3}{3-3} = 34.$$

Otopterus Flower & Lydekker, Mamm. Living & Extinct, 1891, p. 673.



FIG. 134. *OTOPTERUS WATERHOUSII*.

No. 1106 Field Columbian Mus.

Twice nat. size. Nose enlarged 4 times.

Macrotus Gray, Proc. Zool. Soc., 1843, p. 21. (nec Leach, Vespertil., 1816. nec Dej. Coleopt., 1833. nec Reid, Marsupialia, 1836.) Type *Macrotus waterhousii* Gray.

Ears large, united above and between eyes by membrane; tragus acute, elongated; nose-leaf shaped like a horseshoe in front, triangular behind; lower lip grooved, triangular wart in front; antebrachial membrane developed; tail elongate, tapering, projecting beyond margin of interfemoral membrane.

KEY TO THE SPECIES.

A. Ears longer than the head.

a. Forearm over 50 mm.

a.' Above dark reddish brown; yellow patch on hind back.....	<i>O. waterhousii</i>	PAGE 652
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b.' Above dark grayish brown	<i>O. mexicanus</i>	653
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b. Forearm under 30 mm.....	<i>O. californicus</i>	653
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B. Ears as long as the head.

a. Forearm over 50 mm.....	<i>O. bocourtianus</i>	654
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b. Forearm under 50 mm.....	<i>O. bulleri</i>	654
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FIG. CIX. OTOPTERUS WATERHOUSII.
ex Dobson, Cat. Chiroptera.

614. waterhousii (*Macrotus*), Gray, Proc. Zool. Soc., 1843, p. 21.

WATERHOUSE'S LARGE-EARED BAT.

Type locality. Island of Haiti.

Geogr. Distr. Islands of Cuba, Haiti, and Jamaica, West Indies.

Genl. Char. Similar to *O. mexicanus*, but color different; membranes darker; nose-leaf blackish.

Color. Above dark reddish brown, grading into yellowish brown on a patch-like surface on each side of the posterior part of the dorsal region; base of fur white, also at base of ears posteriorly; under parts pale gray; ears brown; membranes black.

Measurements. Total length, 91.2; tail, 26.4; forearm, 50.8; thumb, 8.0; third finger, metacarpal, 38; fourth finger, metacarpal,

36.8; fifth finger, metacarpal, 40.6; tibia, 21.5; foot, 12.7; ear, 30.5; tragus, 11.4. Skull: occipito-nasal length, 23; zygomatic width, 12; height of braincase, 9.5; interorbital constriction, 4; palatal length, 10; postpalatal length, 8; mastoid breadth, 11; length of upper molar series, 8; length of mandible, 17; lower molar series, 9.5.

615. mexicanus (*Macrotus*), Sauss., Rev. Mag. Zool., 2me Sér., XII, 1860, p. 486.

SAUSSURE'S LARGE-EARED BAT.

Type locality. District of Yautepec, near Cuautla, State of Morelos, Mexico.

Geogr. Distr. Tres Marias Islands, State of Jalisco, south to States of Mexico and Oaxaca, Mexico.

Genl. Char. Similar in size to *O. waterhousii* and *O. bocourtianus*, but paler in color; deep groove on side of face beneath eye; ears very large, longer than head; outer margin of ear conch convex, rounded above and with a notch opposite tragus; tragus twice as long as broad, pointed; under lip grooved; nose-leaf small, placed at end of muzzle.

Color. Above dark grayish brown, basal position of fur white; beneath gray tinged with rufous; membranes and ears pale brown.

Measurements. Length of forearm, 50; thumb, 8.8; third finger, metacarpal, 39; fourth finger, metacarpal, 36; fifth finger, metacarpal, 40; tibia, 21.5; foot, 12.7; ear, 30; tragus, 11.4; tail vertebræ, 26.4. Skull: occipito-nasal length, 21; zygomatic width, 12; interorbital width, 4; height of braincase, 8; palatal length, 11; length of mandible, 16.

616. californicus (*Macrotus*), Baird, Proc. Acad. Nat. Scien. Phil., 1858, p. 116. Elliot, Syn. N. Am. Mamm., 1901, p. 420.

CALIFORNIA LARGE-EARED BAT.

Type locality. Old Fort Yuma, San Diego County, California.

Geogr. Distr. Lower California probably (obtained near the border), into southern California.

Genl. Char. Similar to *O. waterhousii* Gray. Auricle longer than head; basal lobes developed; nose-leaf with defined lower border; internal border of tragus thickened, and revoluted portion at base of external border swollen; lower lip grooved with a small wart on each side of the groove; fur bicolor.

Color. Above and below gray, base of fur white, terminal third fawn.

Measurements. Total length, 104; tail vertebræ, 38; tibia, 21; foot, 12.7; forearm, 50.8; longest finger, 36; height of ear, 27.9; tragus, 10.6. Skull: occipito-nasal length, 20.5; zygomatic width, 12;

interorbital constriction, 4.5; palatal length, 9.5; length of mandible, 15.

617. *bocourtianus (*Macrotus*), Dobson, Ann. Mag. Nat. Hist., 4th Ser., XVIII, 1876, p. 436.

BOCOURT'S LARGE-EARED BAT.

Type locality. Vera Paz., Guatemala.

Geogr. Distr. Yucatan? Mexico, Guatemala.

Genl. Char. "Front margin of nose-leaf illy defined, terminal leaf narrow and pointed; last caudal vertebræ and half of the antepenultimate vertebræ, free; the free portion of tail nearly equal to the thumb in length." Similar to *O. waterhousii*, but darker; ears smaller.

Color. Above uniform umber brown, tip of fur light brown and base white; under parts pale grayish brown; membrane blackish when folded, brown when expanded.

Measurements. Total length, 90; forearm, 52; foot, 11.4; third finger, metacarpal, 38; fourth finger, metacarpal, 35.5; tibia, 21.5; ear, 25.4; tragus, 10; tail free from membrane, 10. Skull: occipito-nasal length, 22; zygomatic width, 12; height of braincase, 11; interorbital constriction, 4; palatal length, 10; length of mandible, 16.

618. bulleri (*Macrotus*), H. Allen, Proc. Am. Phil. Soc., XXVIII, 1890, p. 73.

BULLER'S LARGE-EARED BAT.

Type locality. Bolaños, State of Jalisco, Mexico.

Geogr. Distr. States of Jalisco and Guadalajara, Mexico.

Genl. Char. "Auricle scarcely longer than the head; internal basal lobule rudimental and projects about a millimeter beyond the juncture of the interauricular membrane; tragus with convex anterior border for basal two-thirds, and an abruptly acuminate apical third; outer border straight. Skull: Squamosal portion of zygoma not more than one-half the size of that of *M. californicus*." (H. Allen, l. c.)

Color. Above sooty, basal two-thirds of fur white; beneath gray, basal portion of fur whitish.

Measurements. Length of forearm, 44; thumb, 5; first finger, metacarpal, 44; second finger, metacarpal, 45; third finger, metacarpal, 32; fourth finger, metacarpal, 32; tibia, 16; foot, 13; tragus, 6. Skull: occipito-nasal length, 29; zygomatic width, 9; interorbital constriction, 4; height of braincase, 8; palatal length, 8; length of mandible, 14.

*The specimen here described was received at the Field Columbian Museum in a small lot of skins and labeled Yucatan.

The next genus contains the largest species of bat known in the New World, the *V. spectrum*, which formerly bore a very bad reputation, and was accused of sanguineous habits, but all such charges have been proved false, as the animal is now known to subsist mainly on fruits, and is harmless.

142. Vampyrus.

$$I. \frac{2-2}{2-2}; C. \frac{1-1}{1-1}; P. \frac{2-2}{3-3}; M. \frac{3-3}{3-3} = 34.$$

Vampyrus Leach, Trans. Linn. Soc., XIII, 1820, p. 79. Type *Vespertilio spectrum* Linnæus.

Muzzle long, narrow; nose-leaf horseshoe form; ridge on each side of lower lip in front with a deep groove between; wings from base of toes; tail not present, or very short; ears large, not connected; ear conch, terminating in front of base of tragus; tragus long, external marginal processes prominent; outer lower incisors sometimes absent; molar with W-shaped cusps.



FIG. 135. VAMPYRUS SPECTRUM.
Nat. size. Nose view enlarged $\frac{1}{2}$.

619. spectrum (*Vespertilio*), Linn. Syst. Nat., 1, 1758, p. 31; 1, 1766, p. 46.

SPECTER BAT.

Type locality. "America Australi."

Geogr. Distr. Guatemala, Central America, to Brazil, South America; Island of Jamaica.

Genl. Char. Muzzle long and narrow; nose-leaf lanceolate ovate, horseshoe with free expanded margin, laterally turned upward; wide groove bounded by a narrow naked ridge on lower lip; ears large, but shorter than head, rounded above; tragus terminating in an acute process; wing membrane extending to basal third of outer toe; inter-femoral reaching beyond the feet; tail none; canines very large; incisors, $\frac{2-2}{2-2}$.

Color. Above reddish brown, beneath reddish yellow.

Measurements. Total length, 215.9; tail, 76.2; forearm, 106.6; thumb, 33; third finger, metacarpal, 73.6; fourth finger, metacarpal, 76.7; fifth finger, metacarpal, 88.9; tibia, 50.8; foot, 30.4; ear, 45.7; tragus, 13.9. Skull: total length, 51; occipito-nasal length, 43; Hensel, 38.5; zygomatic width, 23.5; interorbital constriction, 9; palatal length, 23; length of upper molar series, 16; length of mandible, 34; length of lower molar series, 18.

143. Chrotopterus.

$$I. \frac{2-2}{1-1}; C. \frac{1-1}{1-1}; P. \frac{2-2}{3-3}; M. \frac{3-3}{3-3} = 32.$$

Chrotopterus Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1865, p. 505. Type *Vampyrus auritus* Peters.

Two lower incisors; second lower premolar very small and drawn inward.

620. auritus (*Vampyrus*), Peters, Abhandl. K. Preuss. Akad. Wiss. Berl., 1856, p. 505, pl. II, figs. 1-5.

PETERS' VAMPIRE BAT.

Type locality. Mexico.

Geogr. Distr. Eastern Mexico into South America to southern Brazil.

Genl. Char. Ears large; wart in center of lower lip with narrow elevation on each side; two warts on chin divided by groove; incisors, $\frac{2-2}{1-1}$; upper middle incisors directed inward; first upper premolar

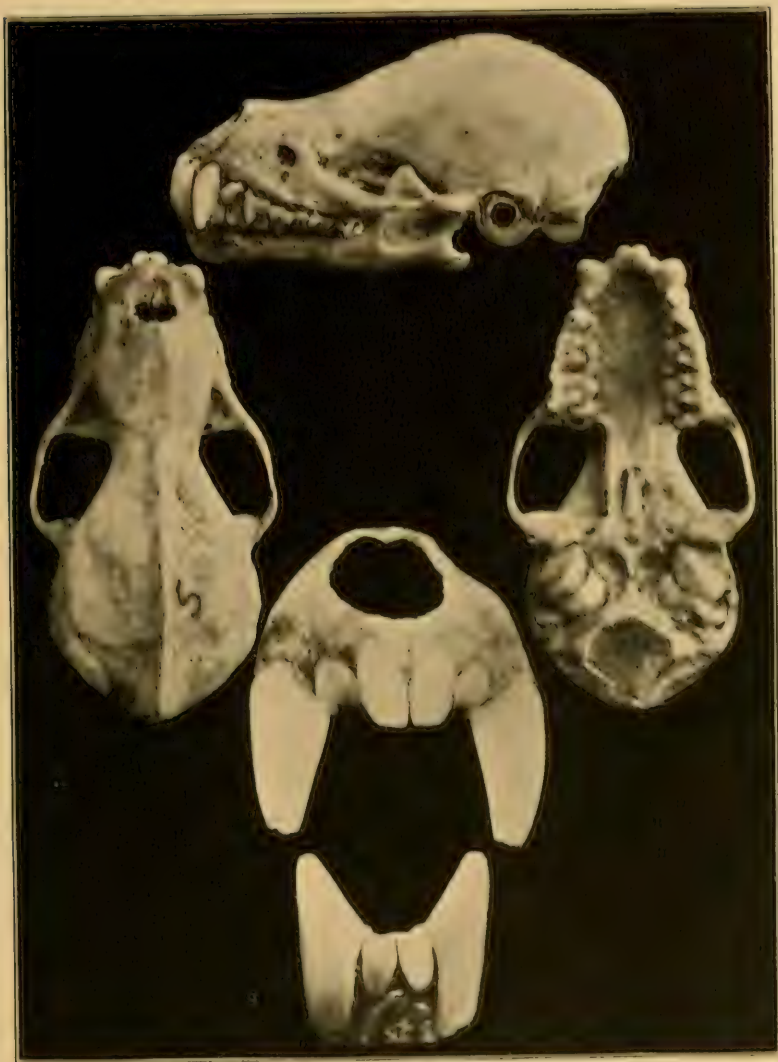


FIG. 136. CHROTOPTERUS AURITUS.

No. 5848 Field Columbian Mus.

Twice nat. size. Nose view enlarged 6 times.

very small and about on a level with the gum; second lower premolar smaller than the first.

Color. Above dark brown, base of hairs whitish; beneath grayish brown; paler at base.

Measurements. Total length, 106.6; forearm, 85; thumb, 25.4; third finger, metacarpal, 58.4; fourth finger, metacarpal, 63.5; fifth



FIG. CX. CHROPTERUS AURITUS.

No. 105607 U. S. Nat. Mus. Coll.

finger, metacarpal, 71; tibia, 36.8; ear, 40.6; tragus, 11.4. Skull: total length, 25; zygomatic width, 13; interorbital constriction, 4.5; height of braincase at bullæ, 11; mastoid breadth, 10.5; palatal length, to alveoli of incisors, 10; length of mandible, 16.

144. Tonatia.

$$I \frac{2}{1-1}; C \frac{1}{1-1}; P \frac{2}{3} \frac{2}{3}; M \frac{3}{3} \frac{3}{3} = 32.$$

Tonatia Gray, in Griff., Cuvier's Anim. Kingd., v, 1827, p. 71 (footnote). Type *Vampyrus bidens* Spix.

Lophostoma D'Orbigny, Voy. Amér. Mérid., 1847, p. 11.

Horseshoe-shaped portion of nose-leaf very narrow at nasal aperture and bound to the muzzle; chin with central wart and smaller lateral ones; ears large with a small posterior basal band; tail short, perforating interfemoral membrane which is large; wing membrane extending to metatarsals or tarsals; skull long and narrow.

621. amblyotis (*Phyllostoma*), Wagn., in Wiegmann, Archiv. f. Naturg., 1843, p. 365.

ROUND-EARED BAT.

Type locality. Mato Grosso, Brazil.

Geogr. Distr. Bogava, Chiriqui, Panama, to Brazil.

Genl. Char. Ears large; tibia long, wing membrane extending to

FIG. 137. *TONATIA AMBLYOTIS*.

No. 3352 Acad. Nat. Sci. Coll.

Twice nat. size. Face enlarged 4 times.

FIG. CXI. *TONATIA AMBLYOTIS*.

No. 5477 Acad. Nat. Sci. Coll.

dorsal surface of second metatarsal; otherwise similar to *T. bidens* Spix.

Color. Above brown, base of hairs whitish; beneath paler brown.

Measurements. Total length, 88.9; tail vertebrae, 12.7; forearm, 55.8; third finger, metacarpal, 41.9; fourth finger, metacarpal, 44.4; fifth finger, metacarpal, 46.4; tibia, 25.4; foot, 15.2; ear, 33; tragus, 10.9. Skull: occipito-nasal length, 26.5; Hensel, 20; zygomatic width, 17; interorbital constriction, 4; height of braincase, above bullae, 11; width of braincase, 11; palatal length, 12; width of palate across last molars from outer edge, 9; length of upper molar series, 6; length of mandible, angle to outer edge of incisor, 17; length of lower molar series, 9.5.

The species of the genus *MICRONYCTERIS* are closely allied to *Vampyrus*, but contain among them some forms of small size. They differ from the genus just named, beside other characters, in not having the horseshoe-shaped membrane free in front, and the wings are not attached to the backs of the feet, but either to the sides or to the extremity of the tibiae.

145. *Micronycteris*.

$$I. \frac{2-2}{2-2}; C. \frac{1-1}{1-1}; P. \frac{2-2}{3-3}; M. \frac{3-3}{3-3} = 34.$$

Micronycteris Gray, Proc. Zool. Soc., 1866, p. 113. Flower & Lydekker, Mamm., Living and Extinct, 1891, p. 673. Type *Phyllophora megalotis* Gray.

Schizostoma Gerv., Expéd. Casteln., Amer. Sud., Zool., 1855, p. 49. (nec Bronn, Mollusca, 1835.)

Vampyrella Reinh., Vidensk. Meddels. Naturh. Foren. Kjöbenh. 3 Aartis, IV, 1872, p. 111.

Front margin of nose-leaf, which is small, fastened to the underlying skin; ears bound on inner sides at their bases by a band hidden in the fur; the ears are large and placed far apart; ear conch terminating in a lobe; tail perforating interfemoral membrane, short; wing membrane from the ankles; forearms and legs hairy or naked. Skull: long, narrow; constriction greater at extremities of nasals than between the temporal fossae.

KEY TO THE SPECIES AND SUBSPECIES.

A. Wings from tarsus or metatarsus.	PAGE
a. Legs and forearms hairy.....	<i>M. hirsutus</i> 661
b. Legs and forearms bare.	



FIG. 138. MICRONYCTERIS MEGALOTIS.

No. 105416 U. S. Nat. Mus. Coll.

Enlarged $2\frac{1}{2}$ times. Face view enlarged 9 times.

- | | |
|---|------|
| a.' Ears from meatus two-thirds the length of forearm. | PAGE |
| a." Longest finger not over 64 mm..... <i>M. megalotis</i> | 662 |
| b." Longest finger over 68 mm..... <i>M. m. mexicanus</i> | 662 |
| b.' Ears from meatus one-half the length of forearm..... <i>M. microtis</i> | 663 |

622. **hirsutus** (*Schizostoma*), Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1869, p. 396.



FIG. CXII. MICRONYCTERIS MEGALOTIS.

ex Dobson, Cat. Chiroptera.

hirsutus (*Micronycteris*), Thomas, Ann. Mag. Nat. Hist., 7th Ser., II, 1898, p. 318.

HAIRY BAT.

Type locality. Unknown.

Geogr. Distr. Pozo Azul, Costa Rica. Altitude, 200 meters; range unknown.

Genl. Char. Second phalanx of middle finger longer than first; calcaneum longer than foot; wings from metatarsus; tail half the length of the interfemoral membrane, which it pierces; face hairy; nose-leaf and muzzle covered with fine hairs as are also the humerus and forearm; nose-leaf horseshoe-shaped, erect portion lancet-shaped; ears longer than the head, united near base; legs and forearms hairy.

Color. Above brown, beneath grayish white; base of hairs brown.

Measurements. Head and body, 55.8; tail, 15.2; forearm, 40.6; third finger, metacarpal, 33; fourth finger, metacarpal, 33; fifth finger, metacarpal, 36.8; tibia, 17.7; foot, 11.4; calcaneum, 12.7; ear, 24.1.

623. megalotis (*Phyllophora*), Gray, Ann. Mag. Nat. Hist., 1st Ser., X, 1842, p. 257.

elongata Gray, Ann. Mag. Nat. Hist., 1st Ser., X, 1842, p. 257. (nec Geoff.)

scrobiculatum Wagn., in Schreb., Säugeth. Suppl., v, 1855, p. 627.

LARGE-EARED VAMPIRE BAT.

Type locality. "Brazil."

Geogr. Distr. Mexico through Central America to Brazil.

Genl. Char. Nose-leaf with width of the horseshoe-shaped portion equal to half the length, the front edge separated from margin of the lip; lance-shaped leaf, narrow, point acute and broader than the horseshoe portion; upper middle incisors notched slightly on outer side of tips; first lower premolar larger than the third; wings from the tarsus; legs and forearms bare.

Color. Above pale brown, beneath ashy; ears large, blackish brown.

Measurements. Total length, 71; tail vertebræ, 15.2; forearm, 36.8; thumb, 10.1; third finger, metacarpal, 31.7; fourth finger, metacarpal, 31.7; fifth finger, metacarpal, 36.8; tibia, 15.2; foot, 11.4. Skull: occipito-nasal length, 17; Hensel, 12; zygomatic width, 8; interorbital constriction, 3.5; palatal length, 7; length of upper molar series, 5; length of mandible, 11; length of lower molar series, 6.

a.—mexicanus (*Micronycteris*), Miller, Proc. Acad. Nat. Scien. Phil., 1898, p. 329.

MEXICAN VAMPIRE BAT.

Type locality. Plantinar, State of Jalisco, Mexico.

Geogr. Distr. State of Jalisco, western Mexico.

Genl. Char. Size of *M. megalotis*, color lighter, middle finger longer.

Color. Like *M. megalotis*, but paler.

Measurements. Total length, 56-65; tail, 12-17; tibia, 14-16.4; foot, 8-10; forearm, 35-37; thumb, 8-10; longest finger, 67-72; ear from crown, 16-18; tragus, 6-7.

624. microtis (*Micronycteris*), Miller, Proc. Acad. Nat. Scien. Phil., 1898, p. 328.

SMALL-EARED NICARAGUAN BAT.

Type locality. Greytown, Nicaragua.

Geogr. Distr. Nicaragua; range unknown.

Genl. Char. Smaller than *M. minutus*; ear half as long as forearm; ears densely furred at base and on inner side; foot half as long as tibia, shorter than calcar; nose-leaf broad, obtusely pointed; forehead highly elevated.

Color. Uniform wood brown; basal third of hairs white.

Measurements. Forearm, 31; thumb, 8.8; longest finger, 58; tibia, 12.6; foot, 8; ear from crown, 12; tragus, 5.8; height of nose-leaf, 3.8. (ex Type.)

146. Glyphonycteris.

$$I. \frac{2-2}{2-2}; C. \frac{1-1}{1-1}; P. \frac{2-2}{3-3}; M. \frac{3-3}{3-3} = 34.$$

Glyphonycteris Thomas, Ann. Mag. Nat. Hist., 6th Ser., xviii, 1896, p. 301. Type *Glyphonycteris sylvestris* Thomas.

"Nose-leaf narrow, bound down to the muzzle in front; chin warts apparently only two, one on each side of a central groove; ears separated, not connected across the head; tail short, perforating the interfemoral membrane and appearing on its upper surface; wing membrane from the side of the ankle; skull thin and papery; profile line from top of muzzle to crown nearly straight, not markedly concave; antorbital region broad, with a distinct inflation just above the anterior corner of each orbit, the breadth of the muzzle over the antorbital foramina much greater than the postorbital breadth; upper middle incisors large, vertical, chisel-shaped; outer incisors minute; canines short, sharply pointed; premolars subequal, oval, or rounded in section; lower incisors tricuspid, subequal." (Thomas, l. c.)

625. sylvestris (*Glyphonycteris*), Thomas, Ann. Mag. Nat. Hist., 6th Ser., XVII, 1896, p. 302.

FOREST BAT.

Type locality. Imravalles, Costa Rica.

Genl. Char. Similar to *Hemiderma perspicillatum*, but smaller; other characters those of the genus.

Color. Above smoky gray; beneath whitish.

Measurements. Head and body, 50; ear, 17; thumb, 9.2; middle finger, metacarpal, 36; tibia, 15; foot, 10.6; calcar, 7.2. Skull: greatest length, 10.7; greatest breadth, 9.6; basal length, 16; width of muzzle over antorbital foramina, 5.7; interorbital constriction, 4.6; from front of upper canines to back of upper molar, 8.

147. Trachyops.

$$I. \frac{2-2}{2-2}, C. \frac{1-1}{1-1}, P. \frac{2-2}{3-3}, M. \frac{3-3}{3-3} = 34.$$

Trachops (*sic*) Gray, Proc. Zool. Soc., 1847, p. 14. Type *Trachops! fuliginosis* Gray = *Vampyrus cirrhosus* Spix.

Trachyops Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1865, p. 512.

Istiophorus (*sic*) Gray, Zool. Journ., II, 1825, p. 242. (nec Lacépède, 1802, Ichthyology.)



FIG. 139. *TRACHYOPS CIRRHOSUS*.
ex Dobson, Cat. Chiroptera.

Muzzle short, with numerous conical warts; nose-leaf narrow in front, erect leaf well developed; ears large; a groove margined with warts on lower lip and chin; interfemoral membrane extending beyond the tail, which penetrates the surface. Skull has a vaulted braincase, and is narrow between postorbital fossæ; upper middle

incisors large, notched, their bases reaching the canines on each side; outer incisors minute, level with the gum; lower incisors equal; first upper premolar half as large as the second, the cusp pointing forward and downward; second lower premolar about equal in size to lower incisor, and not visible from outside.

626. cirrhosus (*Vampyrus*), Spix, Simiar. et Vespert. Bras., 1823, p. 64, pl. xxxvi, fig. iii.

fuliginosus Gray, Proc. Zoöl. Soc., 1847, p. 14.

mexicana Sauss., Rev. Mag. Zoöl., 2me Sér., xii, 1860, p. 484.



FIG. CXIII. TRACHYOPS CIRRHOSUS.
ex Dobson, Cat. Chiroptera. 1½ nat. size.

FRINGED-FACE BAT.

Type locality. Brazil.

Geogr. Distr. Mexico to Brazil.

Genl. Char. Similar to those of the genus.

Color. Above dark reddish brown, base of hairs whitish, tips ashy; beneath, paler brown to base of hairs, tips ashy.

Measurements. Total length, 90.2; tail vertebræ, 13.9; ear, 33; tragus, 12.7; forearm, 59.6; thumb, 15.2; third finger, metacarpal, 45.7; fourth finger, metacarpal, 46.9; fifth finger, metacarpal, 50.8; tibia, 24.1; foot, 16.5.

PHYLLOSTOMA next to *Vampyrus* contains the largest species in the family, and the males possess a well developed glandular sac on the throat opening in front of sternum. This is only rudimentary in the females. These animals live in hollow trees or between large leaves of plants, and resort to forest-clad districts. Like some of the large insectivorous bats, the species of this genus may possibly feed on smaller bats, which fact may have given them the reputation, long borne by *P. hastatum*, of being sanguineous.

148. *Phyllostoma*.

$$I_{\frac{2-2}{2-2}}; C_{\frac{1-1}{1-1}}; P_{\frac{2-2}{2-2}}; M_{\frac{3-3}{3-3}} = 32$$

Phyllostomus (*sic*) Lacépède, Tabl. Divisions sous Div. Ordres et Genres des Mamm., 1799, p. 16. Type *Vespertilio hastatus* Pallas.

Phyllostoma Geoff., Ann. Mus. Hist. Nat. Paris, xv, 1810, p. 174.

Muzzle short, broad; nose-leaf free in front, well developed; a deep V-shaped groove on chin margined by small warts; ears moderate, separate; wing membrane extending to the ankles; middle finger has first phalanx less than one-third the length of metacarpal; tail piercing the interfemoral membrane, which is large and reaches considerably beyond the end of the tail. Skull wider behind canines than between postorbital fossæ; first upper premolar well developed.

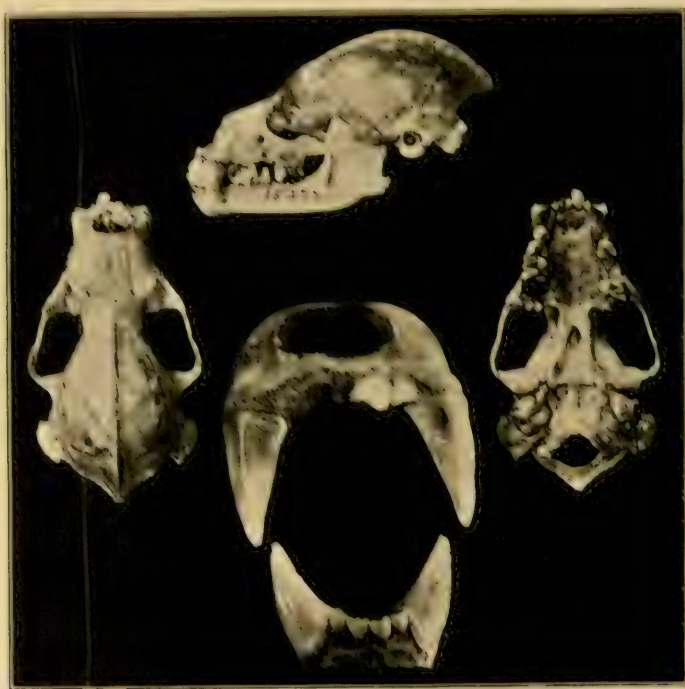


FIG. 140. *PHYLLOSTOMA HASTATUM*.
No. 15222 Am. Mus. Nat. Hist. Coll.
Nat. size. Nose enlarged 3 times

627. *hastatum* (*Vespertilio*), Pall., Spicil. Zool., fasc., III, 1707, p. 7.
maximus Wied, Reise Bras., II, 1820-21, p. 242

SPEAR-NOSED BAT.

Type locality. Unknown



FIG. CXIV. PHYLLOSTOMA HASTATUM.
No. 4871 Acad. Nat. Sci. Coll.

Geogr. Distr. Panama, Central America, to Brazil.

Genl. Char. Ears shorter than the head, obtuse; inner margin of ear conch convex; outer half of outer margin emarginate; tragus longer than wide; nose-leaf surrounded by glandular elevations; horizontal leaf circular, nostrils in the center, between which rises the posterior leaf which is ovate, acuminate, with a longitudinal ridge; lower lip with a wide V-shaped groove margined by nine warts.

Color. Above dark grayish or reddish brown; beneath paler.

Measurements. Total length, 116.8; tail, 17.7; forearm, 81.2; thumb, 16; third finger, metacarpal, 72.3; fourth finger, metacarpal, 68.5; fifth finger, metacarpal, 68.5; tibia, 27.0; foot, 19; tragus, 11.4; ear, 27.9. Skull: occipito-nasal length, 37.5; Hensel, 28; zygomatic width, 21; interorbital constriction, 7; height of braincase at audital meatus, 14; palatal length, 15; width between bullæ, 7; length of upper molar series, alveolar border, 15; length of mandible, angle to symphysis, 26; length of lower molar series, 14.

Mimon bennetti, sometimes included in the North American fauna, does not appear to be recorded north of the Isthmus of Panama.

149. Hemiderma.

$$I_{\frac{2-2}{2-3}}; C_{\frac{1-1}{1-1}}; P_{\frac{2-2}{2-3}}; M_{\frac{3-3}{3-3}} = 32.$$

Hemiderma Gerv. Expéd. Comte Castlenau Amer. Sud. Mamm., Zoöl., 1855, p. 43. Type *Phyllostoma brevicaudum* Wied

Carollia Gray, Mag. Zoöl. & Bot., 11, 1838, p. 488. (nec Cantraine, Mollusca, 1837.)

Ears moderate; muzzle rather narrow; interorbital constriction considerable; superior outline of skull concave; nose-leaf moderately developed; a V-shaped groove in the center of the chin inclosing a wart, and having one also on the outside of groove; tail short, inclosed in interfemoral membrane; wing membrane attached to end of tibia; angle of ridge of molars obtuse; cingulum of upper molars with one interior tubercle.



FIG. 141. *HEMIDERMA PERSPICILLATUM*.

No. 7944 Am. Mus. Nat. Hist. Coll.

Twice nat. size. Incisors enlarged 5 times.

KEY TO THE SPECIES.

- | | |
|--|------------------------------|
| A. Muzzle conical; ear moderate; tail in base of membrane. | |
| a. Large wart in V-shaped groove on chin, margined by warts; forearm, 40 mm. | <i>H. perspicillatum</i> 668 |
| b. Warts on chin in three rows, those in middle the largest; forearm, 32 mm. | <i>H. castaneum</i> 670 |

628. *perspicillatum* Linn., Syst. Nat., 1, 1758, p. 31; 1, 1766, p. 47.
brevicauda (*Phyllostoma*), Wied, Schinz. Thierreich, 1, 1821, p. 164.

- soricius* Spix, Simiar et Vespert. Brasil, 1823, p. 66, pl. xxxvi, figs. II and IV.
grayi Waterhouse, Voy. "Beagle" Mamm., 1844, p. 20, pl. VIII, fig. 3.
lanccolatum Temm., Gray, List. Spec. Mamm., Brit. Mus., 1843, p. 20.
bicolor Wagn., in Schreib. Säugeth. Suppl., I, 1844, p. 400, v, 1855, p. 626.
verrucata Gray, Voy. "Sulphur," Mamm., 1844, p. 20, pl. VIII, fig. 3.
calcaratum Wagn., Abh. Akad., Münch., v, p. 168.



FIG. CXV. *HEMIDERMA PERSPICILLATUM*.
 No. 7944 Am. Mus. Nat. Hist. Coll. Nat. size.

- brachyotum* Burm., Thiere Brasil, 1854, p. 46.
brevicaudum Gerv., Exp. Castlenau, Zoöl., 1855, p. 43, pl. VII, fig. 4, pl. IX, figs. 8-8a.
azteca Sauss., Rev. Mag. Zoöl., 2me Sér., XI, 1860, p. 480, pl. XX, figs. 1, 1a.
minor Gray, Proc. Zoöl. Soc., 1866, p. 115.

SHORT-TAILED BAT.

Type locality. "In America." Unknown.

Geogr. Distr. Mexico to southern Brazil; West Indian Islands.

Genl. Char. Nose-leaf has the front margin reaching that of upper lip; erect portion acuminate between nostrils, no central ridge; ears shorter than head, not attached; tragus with a ridge in front of base of inner margin; a triangle of grooves and warts on lower lip; wings from ankles; tail in membrane, short; upper inner incisors unicuspidate, outer small; lower incisors small, their crowns notched.

Color. General color of entire body dark brown.

Measurements. Head and body, 50.8; tail, 12.7; forearm, 40.6; thumb, 12.7; third finger, metacarpal, 36.8; fourth finger, metacarpal, 35.5; fifth finger, metacarpal, 36.8; tibia, 13.2; foot, 12.7; ear, 19;

tragus, 6.3. Skull: occipito-nasal length, 20; zygomatic width, 9; interorbital constriction, 4; width of rostrum, 6; palatal length, 9; length of mandible, 15.

629. castaneum (*Carollia*), H. Allen, Proc. Am. Phil. Soc., 1890, p. 19.

CHESTNUT COLORED BAT.

Type locality. Costa Rica.

Geogr. Distr. Costa Rica, Central America.

Genl. Char. Smaller than *H. perspicillatum*; ears long as head; tragus acuminate; nostrils rounded; warts on chin in three rows, those of middle row the largest.

Color. Above light chestnut brown; beneath the same, but the central portion of hairs not golden as are those on upper parts.

Measurements. Head and body, 44; forearm, 32; first finger, metacarpal, 4; second finger, metacarpal, 26; third finger, metacarpal, 32; fourth finger, metacarpal, 30; fifth finger, metacarpal, 32; tail, 8; tibia, 13; foot, 10; ear, 15; tragus, 6.

GLOSSOPHAGA, with various other genera ending with CHÆRONYCTERIS, compose the group GLOSSOPHAGÆ, the members of which are distinguished by the long, slender tongue covered with papillæ, and by the deep groove in the under lip. They feed on fruit, berries, and insects, and they vary so much from each other in the shape and number of teeth and other characters, that there are almost as many genera as species. Some are widely distributed and very abundant, while others are local and comparatively rare.

Subfam. III. Glossophaginæ.

150. Glossophaga.

$$I. \frac{2}{3} \frac{2}{3}; C. \frac{1-1}{1-1}; P. \frac{2-2}{3-3}; M. \frac{3-3}{3-3} = 34.$$

Glossophaga Geoff., Mém. du Mus. Hist. Nat. Paris, IV, 1818, p. 418, Pls. 17, 18. Type *Vespertilio soricinus* Pallas.

Phyllophora Gray, Ann. Nat. Hist., or Mag. Zoöl. Bot. & Geol., 11, 1838, p. 489.

Nicon Gray, Proc. Zoöl. Soc., 1847, p. 15. *Id.* Ann. Mag. Nat. Hist., 1st Ser., XIX, 1847, p. 407.

Muzzle long, narrow; tongue very long, extensible, attenuate, with recurved papillæ on sides; erect portion of nose-leaf developed;

lower lip grooved and margined with warts; tail terminating on upper surface of membrane distinct; lower incisors small, sometimes absent; molar series narrow; molars with W-shaped cusps; upper incisors form a continuous row between canines; zygomatic arches well developed.

KEY TO THE SPECIES.

		PAGE
A.	Above dull cinnamon; ear, 9 mm.....	<i>G. mutica</i> 671
B.	Above dark brown; ear, 13.7 mm.....	<i>G. soricina</i> 672
C.	Above walnut brown; ear, 13.5 mm.....	<i>G. s. antillarum</i> 672



FIG. 142. GLOSSOPHAGA SORICINA.

No. 6489 Field Columbian Mus. Coll.

Enlarged $2\frac{1}{2}$ times. Face view enlarged 7 times.

630. mutica (*Glossophaga*), Merr., Proc. Biol. Soc. Wash., xii, 1898, p. 18.

TRES MARIAS BAT.

Type locality. Maria Madre Island, Tres Marias Islands, State of Jalisco, Mexico.

Geogr. Distr. Tres Marias Islands, State of Jalisco, Mexico.

Genl. Char. Similar to *G. soricina*, but rather larger.

Color. Fur above dull cinnamon brown at tip, rest whitish; under parts paler.

Measurements. Total length, 65; tail vertebræ, 8; forearm, 35.5; longest finger, metacarpal, 35.5; tibia, 14; ear, 9; tragus, 4.5.

631. *soricina* (*Vespertilio*), Pall., Misc. Zoöl., 1766, p. 48, pl. IV, figs. 16-18; pl. V.

amplexicaudata, Geoff., Mém. Mus. Hist. Nat. Paris, IV, 1818, p. 418, pl. XVIII.

nigra, Gray, Voy. "Sulphur," Mamm., 1844, p. 18, pl. V, fig. 1.



FIG. CXVI. GLOSSOPHAGA SORICINA.
No. 6489 Field Columbian Mus. Coll.

leachii, Gray, Voy. "Sulphur," Mamm., 1844, p. 18.

caudifer, Gray, Ann. Mag. Nat. Hist., 1st Ser., XIX, 1847, p. 407.

SHREW-LIKE BAT.

Type locality. Unknown.

Geogr. Distr. Southern Mexico to Brazil and Bolivia.

Genl. Char. Mainly those of the genus.

Color. Fur above dark brown at tips, remaining portion yellowish white, beneath gray. base of fur nearly white; long fine hairs from in front of eyes and behind the chin.

Measurements. Length of head and body, 50.8; tail vertebræ, 7.6; forearm, 34.2; third finger, metacarpal, 33; fourth finger, metacarpal, 30.4; fifth finger, 29.2; tibia, 11.4; foot, 9.1; ear, 13.9; tragus, 5. Skull: total length, 21.5; occipito-nasal length, 19; Hensel, 17.5; zygomatic width, 9; interorbital constriction, 4.5; width of braincase above roots of zygomata, 8; palatal length, 10.5; length of upper molar series, 5.5; length of mandible, angle to symphysis, 14.5; length of lower molar series, 6.5.

a.—antillarum (*Glossophaga*), Rehn, Proc. Acad. Nat. Scien. Phil., 1902, p. 37.

ANTILLES BAT.

Type locality. Port Antonio, Island of Jamaica.

Geogr. Distr. Islands of Jamaica and the Bahamas.

Genl. Char. Larger than *G. soricina*. Skull longer, rostrum narrower, and second upper molar larger.

Color. General color and membranes walnut brown, apparently more reddish than *G. soricina*. (Alcoholic specimen.)

Measurements. "Length of forearm, 38; tibia, 13.5; foot, 9.5; ear, 13.5; length of skull, 22.5; of rostrum from interorbital constriction, 11; width of braincase, 9.2; of rostrum at canines, 4." (Rehn.)

The bats of the next genus, which conclude the group, are noted for the length of their muzzles, which exceed all those of the other species of the GLOSSOPHAGÆ.

151. Chæronycteris.

$$I_{2-2}^{2-2}; C_{1-1}^{1-1}; P_{3-3}^{3-3}; M_{3-3}^{3-3} = 36.$$

Chæronycteris "Licht.," Tschudi, Faun. Peruana, 1844, p. 70.

Type *Chæronycteris mexicana* Tschudi.

Upper incisors in pairs, separated by a wide diastema, inner ones smaller than the outer; molars without W-shaped cusps; first upper premolar absent; zygomatic arch wanting; muzzle long; nose-leaf as in *Leptonycteris*; interfemoral membrane large.

KEY TO THE SPECIES.

- | | |
|---|------------------------|
| A. Size large; calcaneum shorter than the foot. | PAGE |
| a. Forearm 42 mm. | <i>C. mexicana</i> 673 |
| B. Size small; calcaneum longer than the foot. | |
| a. Forearm 39 mm.; rostrum long. | <i>C. minor</i> 674 |
| b. Forearm 33.5 mm.; rostrum shorter. | <i>C. godmani</i> 674 |



FIG. CXVII. CHÆRONYCTERIS MEXICANA.
ex Dobson, Cat. Chiroptera.

632. mexicana (*Chæronycteris*), Tschudi, Fauna Peruana, 1844, p. 72, pl. III, fig. 3.

TRES MARIAS ISLANDS BAT.

Type locality. Mexico.

Geogr. Distr. Tres Marias Islands, State of Jalisco, Mexico, to Guatemala.

Genl. Char. Muzzle very long; ears less than half the length of head; wings from ankles; tail short, about one-third the length of the naked interfemoral membrane, and appearing above the latter.

Color. Fur above dark, pale grayish brown at base; under parts light brown.

Measurements. Total length, 72.3; tail, 6.3; thumb, 8.8; forearm, 4.3; third finger, metacarpal, 40.6; fourth finger, metacarpal, 38; fifth finger, metacarpal, 30.8; tibia, 15.7; foot, 10.4; ear, 15.2; tragus, 6.3.

633. minor (*Charonycteris*). Peters, Monatsb. K. Preuss. Ak. Wiss. Berl., 1868, p. 366.

SMALL BAT.

Type locality. Surinam.

Geogr. Distr. Guatemala, Central America to Brazil.

Genl. Char. Smaller than *C. mexicana*; ears shorter and less deeply emarginate externally; calcaneum longer than the foot.

Color. Above dark brown; beneath light brown.

Measurements. Total length, 62.4; tail, 6.6; forearm, 34.2; thumb, 7; third finger, metacarpal, 29.2; fourth finger, metacarpal, 31.7; fifth finger, metacarpal, 29.2; tibia, 11.4; foot, 8.1; ear, 12.2; tragus, 3.8.

634. godmani (*Charonycteris*). Thomas, Ann. Mag. Nat. Hist., 7th Ser., XI, 1903, p. 288.

GODMAN'S BAT.

Type locality. Guatemala.

Genl. Char. Face small, pointed; nose-leaf triangular, broad as high; ears reaching to eyes; antitragal lobe low, rounded, notch shallow; calcar long. Skull: small, delicate; hinder edge of palate level with glenoid surface; pterygoid processes bulbous, reaching to bullæ; basi-occipital excavated on sides of median ridge.

Color. Dull uniform brown, above and beneath.

Measurements. Total length, 54; tail vertebrae, 7; forearm, 33.5; nose-leaf, 3.5×3.0; ear, 0.5; third finger, metacarpal, 32; first phalanx, 13; second phalanx, 17; fifth finger, metacarpal, 28; first phalanx, 8; second phalanx, 0.3; tibia and foot, 10.8; calcar, 6.3; interfemoral membrane at center, 12.5. Skull: greatest length, 10.6; basal length, 17; width of braincase, 8; breadth of muzzle at anterior premolar, 8; tip of muzzle to supraorbital foramen, 7.5; palatal length, 12; width between outer corners of third upper molars, 4; front of canine to back of third upper molar, 7.1. (Thomas, l. c.)

152. *Hylonycteris*.

$$I. \frac{2-2}{0-0}; C. \frac{1-1}{1-1}; P. \frac{2-2}{3-3}; M. \frac{3-3}{3-3} = 30.$$

Hylonycteris Thomas, Ann. Mag. Nat. Hist., 7th Ser., XI, 1903, p. 286. Type *Hylonycteris underwoodi* Thomas.

External characters as in *Cheronycteris*; upper incisors very small; lower incisors absent; no diastema behind upper canines; skull with elongated bony palate, posterior nares level with middle of glenoid surfaces; basioccipital with a prominent median ridge continuous with a similar vomerine ridge, and deeply excavated on each side; no zygomatic arch.

635. underwoodi (*Hylonycteris*), Thomas, Ann. Mag. Nat. Hist., 7th Ser., XI, 1903, p. 287.

UNDERWOOD'S BAT.

Type locality. Rancho Redondo, Costa Rica.

Geogr. Distr. Rancho Redondo and Tarbaca, Costa Rica, Central America.

Genl. Char. Muzzle medium length; nose-leaf small, narrow, pointed without distinct midrib; ears with inner margin convex, tip rounded, outer margin slightly concave above, then convex, the pointed antitragal portion separated by a deep notch; wings from the ankles; wing and interfemoral membranes bare; tooth rows diverging posteriorly.

Color. Seal brown above, crown nearly black; under parts paler.

Measurements. "Nose-leaf, 5.3; ear, 11.5; thumb and claw, 10; index, 32; third finger, metacarpal, 33.5; first phalanx, 14; second phalanx, 18.5; fifth finger, metacarpal, 29; first phalanx, 7.3; second phalanx, 11; tibia, 12; foot and claws, 9.8; calcars, 6; tail, 6; interfemoral at center, 13. Skull: greatest length, 13; basal length, 20.3; interorbital breadth, 4.2; breadth of braincase, 8.6; palatal length, 14.2; front of canine to back of third upper molar, 8.5; same to back of third lower molar, 8.8; tip of muzzle to back of zygoma root, 9.8." (Thomas, l. c.)

153. *Monophyllus*.

$$I. \frac{2-2}{2-2}; C. \frac{1-1}{1-1}; P. \frac{2-2}{3-3}; M. \frac{3-3}{3-3} = 34.$$

Monophyllus Leach, Trans. Linn. Soc., XIII, 1820, p. 75. Type *Monophyllus redmani* Leach.

Nose-leaf, ears, and tragus as in the genus *Glossophaga*; muzzle longer, broader; tongue longer, covered with filiform papillæ; tail

longer than interfemoral membrane; calcaneum rudimentary; inner incisors larger than outer; lower incisors small; zygomatic arches present.



FIG. 143. *MONOPHYLLUS PORTORICENSIS*.
No. 86258 U. S. Nat. Mus. Coll.
2½ times nat. size. Nose enlarged 5 times.

KEY TO THE SPECIES.

- | | | |
|---|-------------------------|----------|
| A. Size small; second upper premolar with postero-internal lobe well developed. | <i>M. portoricensis</i> | PAGE 677 |
| B. Size large; second upper premolar with postero-internal lobe rudimentary. | | |
| a. No space between first and second upper premolars. | <i>M. plethodon</i> | 677 |
| b. A space between first and second upper premolars. | | |
| a.' Bony palate narrow, strongly arched. | | |
| a." Forearm 42 mm. | <i>M. luciae</i> | 678 |
| b." Forearm 38 mm | <i>M. clinodaphus</i> | 678 |
| b.' Bony palate broad, slightly arched. | | |
| a." Size small, total length, 67 mm | <i>M. cubanus</i> | 678 |
| b." Size large, total length, 72.5 mm | <i>M. redmani</i> | 670 |



FIG. CXVIII. MONOPHYLLUS PORTORICENSIS.

No. 86260 U. S. Nat. Mus. Coll. Enlarged twice nat. size.

636. portoricensis (*Monophyllus*), Miller, Proc. Wash. Acad. Scien.,
11, 1900, p. 34.

PORTO RICO NOSE-LEAF BAT.

Type locality. Cave near Bayamon, Porto Rico.

Geogr. Distr. Island of Porto Rico.

Genl. Char. Size small; second upper premolar with prominent postero-internal lobe; tragus thickened along anterior border.

Color. Above seal brown, beneath broccoli brown, tips of hairs grayish.

Measurements. Total length, 60-67; tail, 7-9; forearm, 36-37; first finger, 8.4-10; second finger, 28-32; third finger, 72-76; fourth finger, 53-55; fifth finger, 48-49; tibia, 15-16.4; foot, 8.4-9; ear from crown, 9-10; tragus, 4-5. Skull: greatest length, 19.6; basal length, 18; basilar length, 16; zygomatic breadth, 8.8; interorbital constriction, 4; mastoid breadth, 8.8; greatest breadth of braincase, 8.4; maxillary tooth row, exclusive of incisors, 7; length of mandible, 12.8; lower tooth, exclusive of incisors, 7.

637. plethodon (*Monophyllus*), Miller, Proc. Wash. Acad. Scien.,
11, 1900, p. 35.

BARBADOES NOSE-LEAF BAT.

Type locality. St. Michael's Parish, Barbadoes.

Geogr. Distr. Island of Barbadoes.

Genl. Char. "Second lower premolar shorter than first and in contact with third; no space between upper premolars."

Color. Broccoli brown above, paler below.

Measurements. Total length, 68; tail, 9; forearm, 38; longest finger, 77; tibia, 17; foot, 11; calcar, 2.4; ear from meatus, 13.6;

tragus, 4.8; height of nose-leaf, 5; width, 4. Skull: greatest length, 21.6; basal length, 19.4; zygomatic breadth, 9.8; interorbital constriction, 4.6; greatest breadth of braincase, 9.8; maxillary tooth row, 7.2; mandibular tooth row, 7.8.

638. luciae (*Monophyllus*), Miller, Proc. Acad. Nat. Scien. Phila., 1902, p. 411.

SANTA LUCIA NOSE-LEAF BAT.

Type locality. Island of Santa Lucia.

Genl. Char. Similar to *M. plethodon*, but larger, teeth less crowded; braincase inflated; interorbital region broad; rostrum short.

Color. Above broccoli brown tinged with red; paler beneath.

Measurements. Total length, 80; tail vertebrae, 15; forearm, 42; thumb, 11; second finger, 35; third finger, 88; fourth finger, 65; fifth finger, 55; tibia, 19; foot, 11; ear from meatus, 15; from crown, 11; width, 10.4. Skull: greatest length, 24; basal length, 22; zygomatic breadth, 10; interorbital constriction, 4.4; breadth of braincase, 9.8; maxillary tooth row, 8; mandibular tooth row, 8.4.

639. clinodaphus (*Monophyllus*), Miller, Proc. Wash. Acad. Scien., 11, 1900, p. 30.

MILLER'S NOSE-LEAF BAT.

Type locality. Unknown.

Genl. Char. Space between upper premolars; bony palate narrow and arched; second lower premolar longer than first and not in contact with third.

Color. Above mars brown, beneath wood brown.

Measurements. Total length, 65; tail, 8; forearm, 30; longest finger, 77; tibia, 10.4; foot, 9; calcar, 4; ear from meatus, 12; tragus, 5. Skull: greatest length, 21.8; basal length, 19.4; basilar length, 17.4; zygomatic breadth, 9; interorbital constriction, 4; mastoid breadth, 9; greatest breadth of braincase, 9; depth of braincase, 8; length of upper tooth row, molar series, 8; length of mandible, 14; length of lower tooth row, molar series, 8.4.

640. cubanus (*Monophyllus*), Miller, Proc. Acad. Nat. Scien. Phila., 1902, p. 410.

CUBAN NOSE-LEAF BAT.

Type locality. Baracoa, Island of Cuba.

Genl. Char. Similar to *M. redmani*, but smaller, and skull with narrower rostrum and posterior portion of mandible not so deep.

Color. Above broccoli brown; beneath écreu drab tinged with dull brown; ears and membranes blackish.

Measurements. Total length, 67; tail, 8; forearm, 38.6; thumb, 11;

second finger, 35; third finger, 80; fourth finger, 57; fifth finger, 50; tibia, 16; foot, 11. Skull: greatest length, 21.4; basal length, 20; zygomatic breadth, 9.6; interorbital constriction, 4; greatest width of braincase, 9; rostrum between premolars, 3.2; maxillary tooth row, 8; mandible, 14; mandibular tooth row, 8.4.

641. redmani (*Monophyllus*), Leach, Trans. Linn. Soc., XIII, 1820, p. 76.

REDMAN'S NOSE-LEAF BAT.

Type locality. Island of Jamaica.

Geogr. Distr. Island of Jamaica, possibly also Island of Cuba.

Genl. Char. Ears short, no antitragus; tragus straight, slightly thickened above, tip rounded; nose-leaf broader than high, oval; chin with deep groove in center; membranes naked; feet large; tail with half its length free of membrane.

Color. Above pale Prout's brown, beneath isabella, hairs tipped with pale gray.

Measurements. Total length, 68; tail, 10; forearm, 40; thumb, 9; third finger, 88; fourth finger, 65; fifth finger, 57; tibia, 18; foot, 11; ear, 10; tragus, 5. Skull: greatest length, 22.4; basal length, 21.4; zygomatic breadth, 10; interorbital constriction, 4; breadth of rostrum at space between premolars, 4; breadth of braincase, 9; maxillary tooth row, 8.6; mandibular tooth row, 9.

154. Leptonycteris.

$$I_{\frac{1}{2}}^{\frac{2}{2}} \frac{2}{3}; C_{\frac{1}{1-1}}^{\frac{1}{1-1}}; P_{\frac{2}{3-3}}^{\frac{2}{2-2}}; M_{\frac{2}{2-2}}^{\frac{2}{2-2}} = 30.$$

Leptonycteris Flower & Lydekker Anim. Living & Extinct., 1891, p. 674. Type *Ischnoglossa nivalis* Saussure.

Ischnoglossa Sauss., Rev. Mag. Zoöl., 2me Sér., XII, 1860, p. 492. (nec Kraatz, Coleopt. 1856.)

Upper incisors in pairs separated by a space, arranged in a row between the canines, inner larger than outer. Molars with W-shaped cusps; zygomatic arch complete; no tail; very narrow interfemoral membrane.

642. nivalis (*Ischnoglossa*), Sauss., Rev. Mag. Zoöl., 2me Sér., XII, 1860, p. 492, pl. XX, figs. 2, 2c.

SNOWY BAT.

Type locality. Snow-line on the peak of Mount Orizaba, State of Puebla, Mexico.



FIG. 144. LEPTONYCTERIS NIVALIS.

No. 397 Acad. Nat. Sci. Coll.

Twice nat. size. Face enlarged 5 times.

Geogr. Distr. Southern Mexico into Guatemala.

Genl. Char. Wings from the tibia; calcaneum very short; feet large.

Color. Fur above dark brown, base whitish; under parts paler; wings and interfemoral membrane naked.

Measurements. Length of head and body, 88.9; forearm, 55.8; thumb, 8.9; third finger, metacarpal, 48.2; fourth finger, metacarpal, 44.4; fifth finger, metacarpal, 43; tibia, 12.7; ear, 12.9; tragus, 7

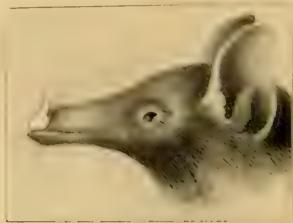


FIG. CXIX. LEPTONYCTERIS NIVALIS. SNOWY BAT.

No. 5864 Acad. Nat. Sci. Coll.

Skull: occipito-nasal length, 19; Hensel, 17; zygomatic width, 9; inter-orbital constriction, 4; length of nasals, 6; palatal length, 10.5; length of upper molar series, 5.5; length of mandible, angle to symphysis, 14; lower molar series, 7.

155. Anura.

$$I_{2-2}^{2-2}; C_{1-1}^{1-1}; P_{4-4}^{3-3}; M_{3-3}^{3-3} = 38.$$

Anoura (*sic*) Gray, Ann. Nat. Hist., or Mag. Zool. Bot. & Geol., II, 1838, p. 490. Type *A. geoffroyi* Gray.

Glossonycteris Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1868, p. 305.

Upper outer incisors triangular, acute, larger than inner pair which are round and blunt; lower incisors deciduous; molars with W-shaped cusp, except the last, which has a V-shaped cusp. First lower premolar close to canine, second lower premolar sometimes present, small; zygomatic arch wanting. Nose-leaf similar to that of *Leptonycteris nivalis*; ears little longer than half the head; tongue with lengthened papillæ along the sides. Wing membrane above the legs and inter-



FIG. 145. ANURA GEOFFROYI.

No. 5781 Coll. Acad. Nat. Scien. Phil.

Twice nat. size. Nose view enlarged 6 times.

femoral membrane to ankles, furred; wing membrane beneath naked; interfemoral fringed beneath.

643. *geoffroyi (*Anoura!*), Gray, Ann. Nat. Hist., or Mag. Zoöl. Bot. & Geol., II, 1838, p. 490. (Desc. Null.) Thomas, Proc. Zoöl. Soc., 1893, p. 335.

peruana (*Charonycteris*), Tschudi, Faun, Peruana, I, 1844, p. 71.

ecaudata Sauss., Rev. Mag. Zoöl., 2me Sér., XII, 1860, p. 493. (nec Geoff.)

lasiopyga Peters, Monatsb. K. Preuss. Ak. Wiss. Berl., 1868, p. 368.

GEOFFROY'S BAT.

Type locality. Brazil.

Geogr. Distr. Mexico through Central America into Brazil and Peru.



FIG. CXX. ANURA GEOFFROYI.

No. 5781 Acad. Nat. Sci. Coll.

Gent. Char. Thumb shorter than foot; wing membrane from distal third of tibia; feet large; no tail; calcaneum rudimentary.

Color. Fur above dark brown, pale brown on basal half; underparts grayish brown, darker at base of hairs.

Measurements. Length of head and body, 60.9; forearm, 40.6; thumb, 8.9; third finger, metacarpal, 40.6; fourth finger, metacarpal, 38; fifth finger, metacarpal, 33.7; tibia, 14.2; foot, 11.4; ear, 15.2; tragus, 5.8. Skull: occipito-nasal length, 21.3; Hensel, 19; zygomatic width, 9; interorbital constriction, 5; palatal length, 11; length of rostrum, 7; width of braincase, 9; height of braincase, above zygomata, 7; length of molar series, 6; length of mandible, 16; length of lower molar series, 6.5.

**Glossonycteris lasiopyga* Peters, Monatsb. Ak. Berl., 1868, p. 368, instead of *Anura geoffroyi*, see Alston, Boreal. Centr. Amer., p. 45.

156. *Lichonycteris*.

$$I. \frac{2-2}{0-0}; C. \frac{1-1}{1-1}; P. \frac{2-2}{3-3}; M. \frac{2-2}{2-2} = 26.$$

Lichonycteris Thomas, Ann. Mag. Nat. Hist., 6th Ser., xvi, 1895, p. 55. Type *Lichonycteris obscurus* Thomas.

"Upper incisors small, not touching each other, standing equidistant in an even curve between the canines. Canines and cheek teeth above and below very slender and delicate; molars narrow with scarcely a trace of W-shaped cusps. Skull light and papery, the elevation of the crown above the face more than in *Glossophaga*, less than in *Charonycteris*. Zygomata absent. Bony palate extending backward almost to the level of the most anterior point of the glenoid facets. Nose-leaf as in *Glossophaga*, but shorter. Ears and tongue as in that genus. Interfemoral membrane well developed. Wings to the terminal part of the metatarsals; calcar distinct." (Thomas, l. c.)



FIG. 146. *LICHONYCTERIS OBSCURUS*.

No. 37553 U. S. Nat. Mus. Coll. Enlarged 7 times.

644. obscurus (*Lichonycteris*), Thomas, Ann. Mag. Nat. Hist., 6th Ser., xvi, 1895, p. 56.

DUSKY BAT.

Type locality. Managua, Nicaragua.

Gcogr. Distr. Nicaragua, Central America.

Genl. Char. Similar to *Glossophaga soricina*; ears short, rounded; basal third of forearm furred; metacarpal of thumb hairy, also along body from middle of humerus to femur; rest of wings naked; tail on upper surface of interfemoral membrane.

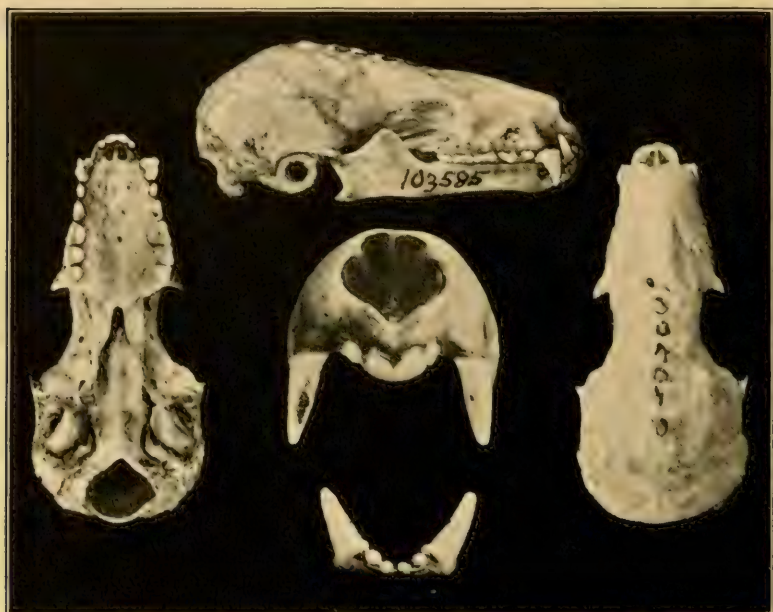
Color. Uniform smoky brown.

Measurements. Head and body, 46; forearm, 33; tail, 67; foot, 7.5; ear, 10; calcar, 5.8. Skull: greatest length, 19.7; basal length, 16.8; width of braincase, 8.1; interorbital constriction, 4; palatal length, 11; from front of canine to back of last molar, 6.4.

157. *Phyllonycteris*.
$$I. \frac{2-2}{2-2}; C. \frac{1-1}{1-1}; P. \frac{2-2}{2-2}; M. \frac{3-3}{3-3} = 32.$$

Phyllonycteris Gundl. & Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1860, p. 817. Type *Phyllonycteris poeyi* Gundlach.

Skull moderately long; erect nose-leaf short; interfemoral membrane narrow, not so long as the tail; tongue and incisors as in *Glossophaga*, molars as in *Hemiderma*, but with less developed cusps.

FIG. 147. *PHYLLONYCTERIS POEYI*.

No. 103585 U. S. Nat. Mus. Coll.

Twice nat. size. Incisors enlarged 5 times.

KEY TO THE SPECIES.

A. Calcaneum distinct.

a. Zygomatic arch complete.

a.' Rim of anterior nares thin, distinctly flaring; teeth small; anterior border of tragus with several fleshy projections near tip; back dark brown. *P. bombifrons* 685

b.' Rim of anterior nares thick, not flaring; teeth large; anterior border of tragus entire; back light clay color. *P. planifrons* 685

- b. *Zygomatic arch incomplete.....*P. szczekorni* 686
 B. †Calcaneum none.....*P. poeyi* 686

645. bombifrons (*Phyllonycteris*), Miller, Proc. Biol. Soc. Wash., XIII, 1899, p. 36.

BAYAMON BAT.

Type locality. Cave near Bayamon, Porto Rico.

Geogr. Distr. Island of Porto Rico.

Genl. Char. Ear moderately long; anterior border of ear conch convex above base; then nearly straight, tip rounded; posterior border denticulate; broad groove between nose-leaf and ridge behind; conspicuous outgrowths from chin. Skull has braincase highly arched at an angle of 30° above plane of rostrum; rostrum rather narrow, short; rim of anterior nares thin, flaring; teeth small.

Color. Above mars brown, fur whitish gray at base; beneath pale wood brown; ears, feet, and membranes dark brown.

Measurements. Total length, 78; tail vertebræ, 14; forearm, 48.4; thumb, 14; second finger, 38; third finger, 81; fourth finger, 65; fifth finger, 64; tibia, 22; foot, 14; ear from crown, 14; tragus, 7. Skull: greatest length, 24.4; basal length, 22; basilar length, 19.8; zygomatic breadth, 12; interorbital constriction, 5; lachrymal breadth, 6; mastoid breadth, 11.4; fronto-palatal depth, 3; depth of braincase from highest point to level of audital bullæ, 10.4; maxillary tooth row (exclusive of incisors), 8; mandible, 16; mandibular tooth row (exclusive of incisor), 9. (Miller, l. c.)

646. planifrons (*Phyllonycteris*), Miller, Proc. Biol. Soc. Wash., XIII, 1899, p. 34.

FLAT-FOREHEAD BAHAMA BAT.

Type locality. Nassau, New Providence Island, Bahamas.

Geogr. Distr. Bahama Islands.

Genl. Char. Ears moderate, rounded at tip; inner side of conch with transverse ridges near posterior border; tragus thickened on anterior border, jagged projections on posterior border; tip pointed; small wart on cheek; nose-leaf oval, broader than high; behind the nose-leaf and separated from it by groove is a horseshoe-shaped ridge; deep groove on chin, with small fleshy projections; membranes naked.

Color. Above light clay color tinged with pinkish buff; basal half of hairs whitish gray; under surface pinkish buff, grayish at base of hairs; ears, feet, and membranes light brown.

Measurements. Total length, 78; tail vertebræ, 14; forearm, 47;

*Miller, Proc. Biol. Soc., Wash., XIII, 1899, p. 33.

†Gundlach, Monatsb. K. Preuss. Akad. Wiss. Berl., 1860, p. 818.

thumb, 12; second finger, 35; third finger, 82; fourth finger, 62; fifth finger, 64; tibia, 22; foot, 14; ear from crown, 15; tragus, 8.2. Skull: greatest length, 25; basal length, 22; basilar length, 20; zygomatic breadth, 11; interorbital breadth, 4.8; lachrymal breadth, 6; mastoid breadth, 11; depth of braincase, 9.6; length of upper molar series, 8.4; length of mandible, 6.4; length of lower molar series, 9.

647. sezekorni (*Phyllonycteris*), Gundl. & Peters, Monatsb., K. Preuss. Akad. Wiss. Berl., 1860, p. 818.

SEZEKORN'S BAT.

Type locality. Cuba.

Geogr. Distr. Islands of Cuba and Jamaica.

Genl. Char. Distinguished from *P. poeyi* by having the nose-leaf terminate posteriorly in a pointed process, and by having a calcaneum.

Color. Similar to *P. poeyi*.

Measurements. Total length, 88.9; tail, 12.7; forearm, 49.5; thumb, 13.9; third finger, 76.2; fourth finger, 62.2; fifth finger, 63.5; tibia, 20.3; foot, 15.2; ear, 20.3; tragus, 7.6.



FIG. CXXI. PHYLLONYCTERIS POEYI.

No. 103527 U. S. Nat. Mus. Coll.

Enlarged twice nat. size.

648. poeyi (*Phyllonycteris*), Gundl. & Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1860, p. 817.

POEY'S BAT.

Type locality. Cuba.

Geogr. Distr. Island of Cuba.

Genl. Char. Teeth large; wing membrane from distal third of tibia; interfemoral membrane short, with the last caudal vertebra projecting beyond it; calcaneum wanting.

Color. Above light brownish yellow; sides of neck and body paler; base and tips of hairs whitish; under parts paler.

Measurements. Total length, 92.7; tail, 10.1; forearm, 40.5; thumb, 12.7; third finger, 78.7; fourth finger, 60.9; fifth finger, 62.2; tibia, 24; foot, 16.5; ear, 17.7; tragus, 7.6. Skull: total length, 23.5; zygomatic width, 11; interorbital width, 5; height of braincase at bullæ, 9.5; mastoid breadth, 11; palatal length, 10; length of upper molar series, 7; length of mandible, 15.

158. Rhithronycteris.

$$I. \frac{2-2}{2-2}; C. \frac{1-1}{1-1}; P. \frac{2-2}{2-2}; M. \frac{3-3}{3-3} = 32.$$

Reithronycteris (*sic*) Miller, Proc. Acad. Nat. Scien. Phil., 1898, p. 333. Type *Rheithronycteris! aphylla* Miller.

Ears small, separate; tongue abruptly narrowed at tip; papillæ short, stiff; tail long as femur. Skull: roof of posterior nares formed by two longitudinal folds proceeding from pterygoids and nearly meeting in the median line; calcar absent; nostrils placed in a disk-shaped elevation without a true leaf. Rostrum heavy; lower jaw heavy. (ex Miller, l. c.)



FIG. 148. RHITHRONYCTERIS APHYLLA.

ex Proc. Acad. Nat. Sci. Phil. About 1½ times nat. size.

649. aphylla (*Rhithronycteris*?), Miller, Proc. Acad. Nat. Scien. Phil., 1898, p. 334.

LEAFLESS OR BLUNT-NOSED BAT.

Type locality. Island of Jamaica.

Geogr. Distr. Island of Jamaica.



FIG. CXXII. RHITHRONYCTERIS APHYLLA.

Genl. Char. Muzzle with disk-shaped nose-leaf; other characters as in genus; concealed wart between corner of mouth and ear.

Color. Light yellowish brown; ears and membranes light brown.

Measurements. Total length, 88; tail, 12; forearm, 48; thumb, 14; second finger, 37; third finger, 84; fourth finger, 66; fifth finger, 64; tibia, 22.8; foot, 17; ear from crown, 13; tragus, 8. Skull: greatest length, 26; basilar length, 20; interorbital breadth, 5.4; mastoid breadth, 12.4; depth of braincase, 9; width of palate between last molars, 5; depth of rostrum at anterior end of first molar, 6; length of upper molar series, 8; length of mandible, 16.6; length of lower molar series, 9.

159. *Brachyphylla*.

$$I_{2-2}^{2-2}; C_{1-1}^{1-1}; P_{2-2}^{2-2}; M_{3-3}^{3-3} = 32.$$

Brachyphylla Gray, Proc. Zool. Soc., 1833, p. 122. Type *Brachyphylla cavernarum* Gray.

Nose-leaf small, bounded on sides and behind by a deep groove, and situated near end of muzzle; nostrils in center of nose-leaf; V-shaped groove in center of lower lip margined with warts; ears separate, obtusely pointed, shorter than head; inner margin convex; wing membrane to the ankles; interfemoral membrane well developed; no tail, and calcaneum short or lacking.



FIG. 149. BRACHYPHYLLA CAVERNARUM.

No. 102350 Coll. U. S. Nat. Mus. Enlarged $\frac{1}{2}$. Nose enlarged 3 times

KEY TO THE SPECIES.

PAGE

- A. Upper parts reddish brown *B. cavernarum* 689
 B. Upper parts chocolate brown, base of fur white *B. nana* 690

650. cavernarum (*Brachyphylla*), Gray, Proc. Zool. Soc., 1833, p. 123
 CAVERN NOSE-LEAF BAT.

Type locality. St. Vincent, Lesser Antilles.

Geogr. Distr. Islands of Cuba, Porto Rico, and St. Vincent.

Genl. Char. Muzzle narrow; nose-leaf oblong, attached to muzzle in front, upper margin emarginate in center; outer margin of tragus above with tooth-like projections; large wart on each cheek under eye, wing membrane with numerous parallel lines of raised papillae. Other characters like genus.

Color. Reddish brown above, beneath paler.

Measurements. Length of head and body, 83.8; forearm, 63.5; thumb, 16.5; third finger, metacarpal, 53.3; fourth finger, 49.5; fifth finger, 52.3; tibia, 25.4; foot, 19; ear, 20.3; tragus, 8.8. Skull: basal length, 28; median palatal length, 14; zygomatic breadth, 17.4; breadth of braincase above roots of zygomata, 13; interorbital con-



FIG. 150. *BRACHYPHYLLA NANA*.
No. 9746 Field Columbian Mus. Coll.
Twice nat. size. Face enlarged $2\frac{1}{2}$ times.

striction, 6.8; lachrymal breadth, 9; maxillary tooth row, 11; crown of first upper molar, 3.4×2.8 .

651. *nana* (*Brachyphylla*), Miller, Proc. Acad. Nat. Scien. Phil., 1902, p. 409. *Id.* Proc. Biol. Soc. Wash., xv, 1902, p. 249.

DWARF NOSE-LEAF BAT.

Type locality. El Guama, Island of Cuba.

Genl. Char. Similar to *B. cavernarum*, but smaller; nose-leaf broader and flatter.

Color. Upper parts chocolate brown, base of fur white; under parts ash brown; membranes blackish; feet blackish brown.



FIG. CXXIII. BRACHYPHYLLA NANA.

No. 9946 Field Columbian Mus. Coll. Twice nat. size

Measurements. Total length, head and body, 83; tibia, 25; foot, 15; forearm, 60; first finger, 12.4; second finger, 48; third finger, 102; fourth finger, 80; fifth finger, 80; ear from meatus, 22.6; ear from crown, 17; width of ear, 14. Skull: basal length, 22; basilar length, 21.6; median palatal length, 10.4; zygomatic breadth, 14.6; width of braincase above roots of zygomata, 12; interorbital constriction, 6; lachrymal breadth, 8.4; maxillary tooth row, 9; crown of first upper molar, 3×2.6 .

The third group in this family, the STERNODERMATÆ, begins with ARTIBEUS and ends with CENTURIO. Unlike the members of the *Glossophagæ*, they have short and broad muzzles. From the conclusions of those who have observed these bats in their native wilds their food appears to be almost wholly tree fruit.

Subfam. IV. **Sternodermatinæ.**

160. *Artibeus.

$$I. \frac{2}{2} \frac{2}{2}; C. \frac{1}{1} \frac{1}{1}; P. \frac{2}{2} \frac{2}{2}; M. \frac{2}{3} \frac{2}{3} = 30.$$

Artibeus Leach, Trans. Linn. Soc. Lond., XIII, 1820, p. 75. Type *Artibeus jamaicensis* Leach.

Madatacus Leach, Trans. Linn. Soc. Lond., XIII, 1820, p. 81.

Pteroderma Gerv., Exp. Castlenau, Amer. Sud., Mamm., Zoöl., 1855, p. 34.

Nostrils on surface of nose-leaf; palate extending behind last

*ἄρτι, βῆω = Artibeus.

molars; upper middle incisor straight, broad, cutting edge notched; outer incisors very small, cusps oblique; molars broad; second molar above and below, smaller than the first; face of skull flat, broad; no tail; wing membrane from the feet; interfemoral membrane emarginate posteriorly; lower lip with central wart and a smaller one on each side, these surrounded on sides and below with smaller warts; conical papillæ on inner margin of lips.



FIG. 151. *ARTIBEUS JAMAICENSIS*.

No. 102460 U. S. Nat. Mus. Coll. Skull enlarged $2\frac{1}{2}$ times.

Incisors enlarged 4 times.

KEY TO THE SPECIES.

	PAGE
A. Front edge of nose-leaf fastened down.	
a. Head without white streaks.	<i>A. coryi</i> 693
b. Head with white streaks.	
a.' General hue grayish.	
a." Forearm 60 mm.	<i>A. jamaicensis</i> 693

b." Forearm 52.5 mm.....	<i>A. parvipes</i>	694
b.' General hue sooty brown.....	<i>A. intermedius</i>	694
B. Front edge of nose-leaf free.		
a. General hue black tinged with gray.....	<i>A. planirostris</i>	695
b. General hue hair brown.....	<i>A. watsoni</i>	696
c. General hue red brown.....	<i>A. eva</i>	697

652. coryi (*Artibeus*), Allen, Bull. Amer. Mus. Nat. Hist., 1890, p. 173.

CORY'S BAT.

Type locality. St. Andrew's Island, Carribean Sea.

Genl. Char. Ear short, broad; nose-leaf small, pointed; inter-femoral membrane emarginate to below the knees.

Color. Above dusky seal brown, darkest posteriorly and on sides, below lighter, hairs tipped with gray; no white streak on face.

Measurements. Length, head and body, 73.7; forearm, 50.1; thumb, 6.4; longest finger, 70; ear, 11.5; tragus, 5.1; nose-leaf, 9; free portion, 4.6; foot, 16.5.



FIG. CXXIV. ARTIBEUS JAMAICENSIS.

A. *Artibeus*.

653. *jamaicensis Leach, Trans. Linn. Soc. Lond., XIII, 1820, p. 75.
carpolegus Gosse, Nat. Sojourn in Jamaica, 1851, p. 271, pl. VI,
 fig. 5.

*For the employment of this name see Thomas Ann. Mag. Nat. Hist., 7th Ser., VIII, 1901, p. 192, nec Allen and Chapman, Bull. Am. Mus. Nat. Hist., 1897, p. 3.

JAMAICA BAT.

Type locality. Island of Jamaica.

Geogr. Distr. Mexico to Brazil and Bolivia; West Indies.

Genl. Char. Anterior margin of nose-leaf bound to muzzle; third upper premolar absent.

Color. Fur with basal portion brown, tips of hairs grayish; under parts grayish, basal portions light brown; two white streaks on head, and occasionally a white patch at junction of shoulder and antebrachial membrane.

Measurements. Length of head and body, 85; forearm, 68.5; thumb, 15.2; third finger, metacarpal, 63.5; fourth finger, metacarpal, 59.6; fifth finger, metacarpal, 63.5; tibia, 24.1; foot, 16.5; ear, 22.8. Skull: occipito-nasal length, 24; zygomatic width, 15; least interorbital width, 7; mastoid width, 13; height of braincase at bullæ, 12; palatal length, 15; width of palate at last molars, 6; length of mandible, 17.

654. parvipes (*Artibeus*), Rehn, Proc. Acad. Nat. Scien. Phila., 1902, p. 639.

SMALL-FOOTED BAT.

Type locality. Santiago de Cuba, Cuba.

Geogr. Distr. Island of Cuba.

Genl. Char. Similar to *A. jamaicensis*, but forearm and tibia smaller, and a narrower foot.

Color. Specimens in alcohol, color not definable.

Measurements. Forearm, 52.5; tibia, 21.5; foot, 14; ear, 16.5.

655. intermedius (*Artibeus*), Allen, Bull. Am. Mus. Nat. Hist., 1897, p. 33.

carpolegus Allen, Bull. Am. Mus. Nat. Hist., 1891, p. 205. (nec Gosse.)

INTERMEDIATE BAT.

Type locality. San José, Costa, Rica.

Geogr. Distr. Costa Rica.

Genl. Char. Small; no stripes on cheeks; head stripes narrow. Skull: braincase high and narrow, superior outline convex.

Color. Above dark sooty gray; beneath grayish.

Measurements. Forearm, 65; thumb to end of claw, 15; third finger, metacarpal, 57; tibia, 22; foot, 17. Skull: total length, 29; zygomatic width, 19; mastoid width, 16; length of palate, 14; interorbital constriction, 6; height of braincase from lower side of audital bullæ, 12; width of palate inside of middle molars, 5.5; outside, 13; length of upper molar series, 8; length of mandible, 19; length of lower molar series, 10.



FIG. 152. ARTIBEUS PLANIROSTRIS.

No. 10755 Am. Mus. Nat. Hist. Coll.

Twice nat. size. Incisors enlarged 4 times.

656. **planirostris** (*Phyllostoma*). Spix, Simiar. et Vespert. Brasil, 1823, p. 66, pl. xxxvi, fig. 1.
obscurum Wied, Beitr. Naturg. Brasil, II, 1826, p. 203.
perspicillatum Burm., Thiere Brasil, 1854, p. 45.
fallax Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1865, p. 355.

FLAT-NOSED BAT.

Type locality. Near Bahia, Brazil.

Geogr. Distr. State of Guerrero, Mexico, to Brazil. Island of Grenada.

Genl. Char. Ears shorter than the head; nose-leaf developed, anterior margin free; lower lip in front with three warts arranged in triangle, with eight or ten smaller ones on sides and beneath; wing



FIG. CXXV. ARTIBEUS PLANIROSTRIS.

No. 4874 Acad. Nat. Scien. Phil. Coll.

membrane nearly naked; last molar very small, placed on inner posterior side of second molar; lower incisors very small.

Color. General hue black tinged with gray, hairs whitish at base; white streak on each side of face from above the eye to crown.

Measurements. Length of head and body, 81.2; forearm, 66.0; thumb, 15.2; third finger, metacarpal, 58.4; fourth finger, metacarpal, 57; fifth finger, metacarpal, 58; tibia, 24; foot, 16.5; ear, 13.9; tragus, 7. Skull: occipito-nasal length, 25; zygomatic breadth, 17; height of braincase at bullæ, 11; interorbital constriction, 7; mastoid width, 13.5; palatal length, 12; width of palate at last molars, 5.5; length of mandible, 16.

657. watsoni (*Artibeus*), Thomas, Ann. Mag. Nat. Hist., 7th Ser., VII, 1901, p. 542.

WATSON'S BAT.

Type locality. Bogaba, Chiriqui, Panama. Altitude, 1,000 feet.

Geogr. Distr. Costa Rica, Central America.

Genl. Char. "Nose-leaf similar to that of *A. glaucus*, but apparently rather narrower; ears higher and narrower than in that species, inner margin evenly convex, tip narrowly rounded, outer margin deeply concave in its upper half, then convex, ending below in a slightly angular antitragal lobe; tragus more sharply pointed than in *A. glaucus*, and the projections on the outer margin more prominent; teeth closely similar in their proportions to those of *A. glaucus*; posterior lower molar minute." (Thomas, l. c.)

Color. General hue hair brown; hairs whitish tipped with brown.

Measurements. "Third finger, metacarpal, 36; first phalanx, 14; second phalanx, 20; depth of interfemoral, 11; tarsus, 17. Ear: length, 15; breadth from most convex point of inner to most concave part of outer margin, 9. Skull: greatest length (approximate), 19; zygomatic breadth, 11.7; interfemoral breadth, 4.5; mastoid breadth, 9.5; palate length, 8.5; breadth across molars, 8.3; front of upper canine to back of m^2 , 6.2." (Thomas, l. c.)

658. eva (*Dermanura*), Cope, Amer. Nat., XXIII, 1889, p. 130. Feby. ST. MARTIN BAT.

Type locality. Island of St. Martin, West Indies.

Genl. Char. Inferior border of horseshoe free; ear reaching to center of eye; tragus acuminate, widest in the middle; interfemoral membrane to middle of tibia.

Color. General hue brown, tinged with red on limbs and head.

Measurements. Length of head and body, 79; nose-leaf, 12.5; forearm, 59; tibia, 21; foot, 17.

161. Uroderma.

$$I. \frac{2-2}{2-2}; C. \frac{1-1}{1-1}; P. \frac{1-1}{2-2}; M. \frac{3-3}{3-3} = 30.$$

Uroderma Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1865, p. 588 (foot note). Type *Uroderma bilobatum* Peters.

Similar to *Artibeus*, but differs in having two additional upper molars.

659. convexum (*Uroderma*), Lyon, Proc. Biol. Soc. Wash., xv, 1902, p. 83.

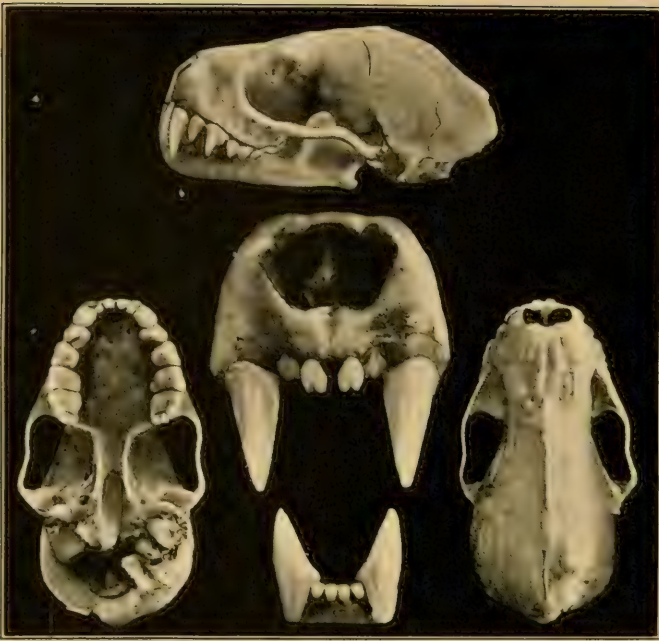
COLON BAT.

Type locality. Colon, Columbia.

Geogr. Distr. Known only from type locality.

Genl. Char. Like *U. bilobatum*, Peters, from Guiana and Brazil, but with tooth rows arcuate.

Color. Upper parts sepia, hairs at base broccoli brown; hairs of under parts light broccoli brown tipped with hoary; two white bands on side of head, the upper extending from posterior outer edge of nose-leaf over eyes nearly to posterior edge of ear, the lower from angle of mouth almost to tragus; narrow white line on middle of back; rims of ears and attached portion of nose-leaf whitish; nose-leaf, ears, and wing membranes blackish brown.

FIG. 153. *URODERMA CONVEXUM*.

No. 111722 U. S. Nat. Mus. Coll. Type.

Twice nat. size. Nose view enlarged 5 times

Measurements. "Forearm, 43; longest finger, 92; tibia, 16; foot, 10; calcar, 5; nose-leaf from tip of lance to lower edge of rounded lobe just above lip, 9.4; greatest width of lance, 4; greatest width of rounded portion of nose-leaf, 5; height of ear from notch in front

FIG. CXXVI. *URODERMA CONVEXUM*.

No. 111722 U. S. Nat. Mus. Coll. Type.

of antitragus, 9; greatest width of ear, 8; greatest length of skull, 23.4; zygomatic width of skull, 13; front of incisors to posterior edge of palate, 11.4; length of palate, posterior to last molars, 2.6; front of upper canine alveolus to posterior edge of last upper molar, 8; greatest width between outer surface of upper molars at alveoli, 9.6; greatest length of mandible, 15; front of lower canine at alveolus to posterior edge of last molar, 8.4." (Lyon, l. c. ex Type.)

162. Dermanura.

$$I_{2-2}^{2-2}, C_{1-1}^{1-1}, P_{2-2}^{2-2}, M_{2-2}^{2-2} = 28.$$

Dermanura Gervais, Expéd. Comte de Castelnau, Amér. Sud. Mamm., Zoöl., 1855, p. 36. Type *Dermanura cinereum* Gervais.

Molars similar to those of *Artibeus*, but only four pairs; inter-femoral membrane emarginate; other characters as in *Artibeus*.

KEY TO THE SPECIES.

PAGE

- A. Size small, uniform light yellowish brown *D. phæotis* 699
 B. Size large, black tinged with ashy *D. cinereum* 699

660. phæotis (*Dermanura*), Miller, Proc. Acad. Nat. Scien. Phila., 1902, p. 405.

DARK-EARED BAT.

Type locality. Chichen Itza, Yucatan.

Genl. Char. Smaller than *D. cinereum* and paler; palate with two rows of small foramina.

Color. Uniform light yellowish brown, washed with broccoli brown; ears dark brown without white edging; four facial whitish stripes.

Measurements. Forearm, 37; thumb, 9.6; second finger, 31; third finger, 78; fourth finger, 62; fifth finger, 57; tibia, 14; foot, 9. Skull: greatest length, 19; zygomatic breadth, 11.6; mastoid breadth, 10.

661. cinereum (*Dermanura*), Gerv., Expéd. Castlenau, Amér. Sud. Mamm., Zoöl., 1855, p. 36, pl. viii, fig. 4; pl. ix, figs. 4 and 4a; pl. xi, fig. 3.

tolteca (*Stenoderma*), Sauss., Rev. Mag. Zoöl., 2me Sér., xii, 1860, p. 427, pl. xv, fig. 4.

CINEREOUS BAT.

Type locality. Brazil.

Geogr. Distr. Mexico to Brazil.

Genl. Char. Similar to *A. jamaicensis*, but smaller.

Color. Above and beneath black tinged with ashy; no white streaks.

Measurements. Length of head and body, 54.1; forearm, 40.6; thumb, 10; third finger, metacarpal, 36.8; fifth finger, metacarpal,

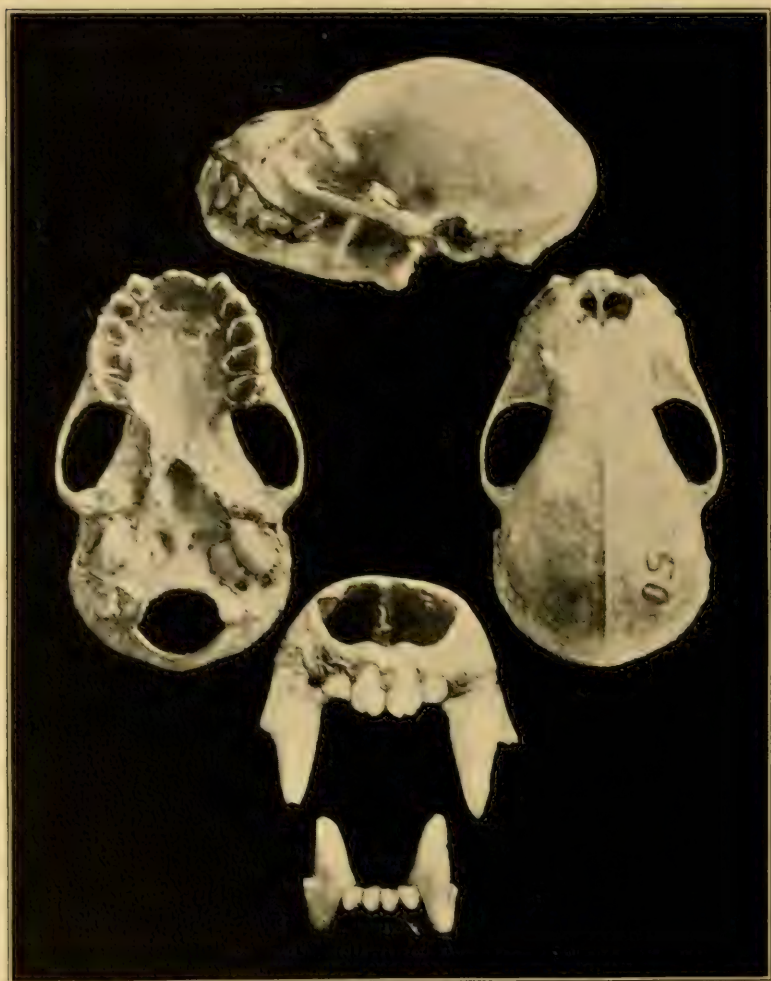


FIG. 154. *DERMANURA CINEREUM*.

No. 49350 U. S. Nat. Mus. Coll.

Enlarged $2\frac{1}{2}$ times. Incisors enlarged 6 times



FIG. CXXVII. *DERMANURA QUADRIVITTATUM*.
No. 10287 U. S. Nat. Mus. Coll. Twice nat. size

36.8; tibia, 13.9; foot, 10; ear, 16.5; tragus, 6.3. Skull: occipito-nasal length, 18; zygomatic width, 12; height of base at bullæ, 10; interorbital constriction, 5; mastoid breadth, 10.5; palatal length, 9; length of mandible, 12.5.

163. *Vampyrops*.

$$I. \frac{2}{2} - \frac{2}{2}; C. \frac{1}{1} - \frac{1}{1}; P. \frac{2}{2} - \frac{2}{2}; M. \frac{3}{3} - \frac{3}{3} = 32.$$

Vampyrops Peters, Monatsb. Preuss. Akad. Wiss. Berl., 1865, p. 356.

Type *Phyllostoma lineatum* E. Geoffrey.

Vampyressa Thomas, Ann. Mag. Nat. Hist., 7th Ser., v, 1900, p. 270.

Vampyriscus, Thomas, Ann. Mag. Nat. Hist., 7th Ser., v, 1900, p. 270.

Vampyrodes, Thomas, Ann. Mag. Nat. Hist., 7th Ser., v, 1900, p. 270.

Upper middle incisors conical, obliquely directed; molars narrow; facial portion of skull, produced, narrow; tragus incised externally opposite base of inner margin.

KEY TO THE SPECIES.

A Size small.

- | | | |
|--|--------------------|-----|
| a. Forearm 41.25 mm. Color dark brown, beneath ashy brown..... | <i>V. lineatus</i> | 702 |
| b. Forearm 35 mm. Color paler | <i>V. helleri</i> | 703 |

B. Size large.

- | | | |
|---------------------------|--------------------|-----|
| a. Forearm 58.75 mm | <i>V. vittatus</i> | 704 |
|---------------------------|--------------------|-----|

662. *lineatus* (*Phyllostoma*), E. Geoff., Ann. du Mus. Hist. Nat. Paris, xv, 1810, p. 180.

WHITE-STRIPED BAT.

Type locality. Paraguay.

Geogr. Distr. Mexico to Paraguay.

Genl. Char. Characters those of genus. Outer upper incisors very small, conical, straight; first upper premolar like a canine,



FIG. 155. VAMPYROPS HELLERI.

No. 7948 Am. Mus. Nat. Hist. Coll.

Enlarged $2\frac{1}{2}$ times. Nose view enlarged 5 times.

straight; posterior upper molar situated on inner side of second molar; wing membrane from base of toes; interfemoral membrane short, concave; inner and outer side of ear conch on lower part margined with white; tragus acuminate, rounded lobe at base of outer margin, with a projecting tooth above.

Color. Above dark brown; under parts ashy brown; four white streaks on face; from occiput to interfemoral membrane is a narrow line of white.

Measurements. Length of head and body, 58.4; forearm, 41.9;

thumb, 10; third finger, metacarpal, 38; fourth finger, metacarpal, 38; fifth finger, metacarpal, 38; tibia, 15.2; foot, 10; ear, 16.5.

663. *helleri* (*Vampyrops*), Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1866, p. 392.

HELLER'S WHITE-STRIPED BAT.

Type locality. "Mexico."

Geogr. Distr. Mexico to South America, Venezuela. Chiriqui, Panama, and San Miguel Island, Bay of Panama. (Bangs.)

Genl. Char. Horseshoe of nose-leaf free on edge, lanceolate portion with broad longitudinal ridge; ears rounded, emarginate externally,



FIG. CXXVIII. *VAMPYROPS VITTATUS*.

No. 5496 Acad. Nat. Sci. Coll.

and with lobe at base; tragus pointed, serrately toothed on outer edge and with a nearly two-lobed process at base; large wart on under lip, margined with two smaller warts, and near them seven warts on a side forming an angle; wings from base of toes.

Color. General hue brown, lighter than that of *V. lineatus*; four white streaks on face and a narrow one from crown along center of the back.

Measurements. Head and body, 66; forearm, 35.5; thumb, 12.7; third finger, metacarpal, 51.6; fourth finger, metacarpal, 54.6; fifth finger, metacarpal, 55.8; tibia, 21.5; ear, 22.8; tragus, 8.9. Skull: occipito-nasal length, 19.5; Hensel, 17; zygomatic width, 12; inter-orbital constriction, 5; palatal length, 9; width of braincase at squamosals, 9; length of upper molar series, 6; width of palate between last molars, 5; length of mandible angle to symphysis, 14; length of lower molar series, 7.

664. vittatus (*Artibeus*), Peters, Monatsb. K. Preuss. Ak. Wiss. Berl., 1859, p. 225.

PETERS' WHITE-STRIPED BAT.

Type locality. Puerto Cabello, Venezuela.

Geogr. Distr. Costa Rica, Central America, to northern South America.

Genl. Char. Size large. Muzzle long, narrow; horseshoe free all around; tragus similar to that of *V. lineatus*; fur extending outward on wing membrane between elbow and middle of femur.

Color. General hue above and below dark brown; white line from crown along back; short naked white patch on each side of face.

Measurements. Length of head and body, 86.3; forearm, 59.6; thumb, 12.7; third finger, metacarpal, 54.6; fourth finger, metacarpal, 54.6; fifth finger, metacarpal, 55.8; tibia, 21.5; foot, 15.2; ear, 22.8; tragus, 8.9. Skull: palatal length, 16.6; interorbital constriction, 7.6; zygomatic breadth, 19; breadth of palate between middle molars, 8.4; length of mandible, 22.4; length of upper tooth row, 12.6; length of lower tooth row, 13.4.

164. Sternoderma.

$$I. \frac{2-2}{2-2}, C. \frac{1-1}{1-1}, P. \frac{2-2}{2-2}, M. \frac{2-2}{3-3} \text{ or } \frac{3-3}{3-3} = 30 \text{ or } 32.$$

Sternoderma E. Geoff., Descr. de l'Egypte, Mamm., II, 1818, p. 114.

Type *Sternoderma rufum* E. Geoffroy.

Artibeus Gerv., Expéd. Casteln. Amér. Sud. Mamm., Zoöl., 1855, p. 34. (nec Leach.)

Arctus Gray, Ann. Hist. Nat., or Mag. Zoöl. Bot. Geol., II, 1838, p. 491. *Id.* Proc. Zoöl. Soc., 1866, p. 117.

Histiops Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1869, p. 399.

Peltorhinus Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1876, p. 433.

Muzzle short, broad; ear and nose-leaf as in *Artibeus*, as are also most of the external characters, but the skull differs in having the horizontal plate of the palatal bones partially or wholly absent; palate is wide, short, and deeply emarginate posteriorly; molars broad, crowns concave.

KEY TO THE SPECIES.

A. Central upper incisors bicuspidate; molars $\frac{3-3}{3-3}$.		PAGE
a. Above and beneath slaty gray	<i>S. montserratense</i>	705
b. Above and beneath dull brown	<i>S. nicholli</i>	706

- c. Uniform clay color *S. luciae* 706
 d. Above light reddish brown, paler beneath. *S. achradoophilum* 707

A. *Sternoderma*.

665. *montserratense* (*Sternoderma*), Thomas, Proc. Zool. Soc., 1894,
 p. 133.

MONTSERRAT BAT.

Type locality. Island of Montserrat, West Indies.



FIG. 156. STERNODERMA ACHRADOPHILUM.

No. 113502 U. S. Nat. Mus. Coll.

Twice nat. size. Nose enlarged 4 times.

Genl. Char. Size large, stout; molars, $\frac{3-3}{3-3}$; upper incisors bicuspidate; last upper molar oval; palatal emargination long, narrow; no facial streaks or shoulder marks.

Color. Slaty gray.

Measurements. Total length, 69; forearm, 51.5; knee to end of claws, 35.5; ear from notch, 16.5. Skull: basal length, 18.2; greatest length, 23.6; zygomatic breadth, 16; interorbital constriction, 7.1; width of palate inside first upper molars, 4.4; outside, 10.5; basion

to front of palatal notch, 13.2; front of canine to back of second upper molar, 7.4.

666. nichollsi (*Sternoderma*), Thos., Ann. Mag. Nat. Hist., 6th Ser., VII, 1891, p. 529.

NICHOLLS' BAT.

Type locality. Island of Dominica, West Indies.

Genl. Char. Size smaller than that of *S. montserratense*; upper incisors bicuspidate; molars, $\frac{3-3}{3-3}$, broad; frontal ridges absent; palatal emargination narrow, reaching to the middle of first upper molar.

Color. Dull brown, uniform.

Measurements. Head and body, 53; forearm, 44; thumb, 11.6;



FIG. CXXIX. STERNODERMA LUCIÆ.

No. 110917 U. S. Nat. Mus. Coll.

second finger, 36; third finger, 96; fourth finger, 76; fifth finger, 66; tibia, 16.4; foot, 12; ear from meatus, 18; from crown, 13.6; width, 14. Skull: greatest length, 20.4; basal length, 17; interorbital constriction, 5.4; zygomatic breadth, 13.6; mastoid breadth, 11; breadth of palate between molars, 3.6; mandible, 12; maxillary tooth row, 6.4; mandibular tooth row, 6.8.

667. luciae (*Sternoderma*), Miller, Proc. Acad. Nat. Scien. Phila., 1902, p. 407.

ST. LUCIA BAT.

Type locality. Island of Santa Lucia.

Genl. Char. Similar to *S. nichollsi*, but larger, posterior molar minute, second lower molar with nearly square outline to crown.

Color. Uniform clay color; back, limbs, and membranes washed with wood brown; small white spot on shoulder; membranes dark

brown; antebrachium with pale border from thumb half way to shoulder.

Measurements. Total length, 65; forearm, 47; thumb, 15; second finger, 41; third finger, 110; fourth finger, 76; fifth finger, 71; tibia, 19; foot, 12.6; ear from meatus, 18; from crown, 14; width, 14. Skull: greatest length, 23; basal length, 20; interorbital constriction, 6; zygomatic breadth, 15; mastoid breadth, 12; mandible, 13.4; maxillary tooth row, 7.6; mandibular tooth row, 8.

B. *Peltorhinus*.

Nose-leaf attached in front to the tubercle on upper lip, spear-shaped, oval, acute; fur fine, woolly, sparsely covering forearm; wing membrane extending to claws.

668. *achradophilum* (*Artibeus*). Gosse, Nat. Sojourn in Jamaica, 1851, p. 271, pl. VI, fig. 4.

sulphureus Gosse, Nat. Sojourn in Jamaica, 1851, p. 271, pl. VI, fig. 5.

jamaicensis Gosse, Nat. Sojourn in Jamaica, 1851, p. 271, pl. VI, fig. 3.

flavescens Gray, Proc. Zool. Soc., 1866, p. 117.

FRUIT-LOVING BAT.

Type locality. Content, Island of Jamaica.

Geogr. Distr. Islands of Cuba and Jamaica.

Genl. Char. Muzzle short; front margin of horizontal nose-leaf projecting in a V-shaped process and ending in a wart-like elevation; posterior nose-leaf lanceolate, summit acute, central ridge on front face; central wart on lower lip, one on each side, and two others beneath; interfemoral membrane short; wing membrane from tarsus.

Color. Above light reddish brown, beneath paler; white patch on each shoulder.

Measurements. Length of head and body, 55.8; forearm, 40.6; thumb, 10; third finger, metacarpal, 40.6; fourth finger, metacarpal, 40.6; fifth finger, metacarpal, 41.4; tibia, 15.2; foot, 10; ear, 17.7; tragus, 5.5. Skull: occipito-nasal length, 23; Hensel, 16; zygomatic width, 15; interorbital constriction, 5.5; palatal length, 11.5; length of upper tooth row, 6.5.

165. *Phyllops*.

Phyllops Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1865, p. 356. Type *Artibeus falcatus* Gray.

Molars as in *Artibeus*; palate deeply cleft between molars; second upper molar three-fourths size of the first; nose-leaf abruptly narrowed above, acute at tip.

669. **falcatum** (*Artibeus*), Gray, Ann. Mag. Nat. Hist., iv, 1830, p. 1.
albomaculatum (*Phyllostoma*), Gundl., Monatsb. K. Preuss. Akad.
 Wiss. Berl., 1861, p. 155.

FALCATE BAT.

Type locality. Cuba.

Geogr. Distr. Island of Cuba.

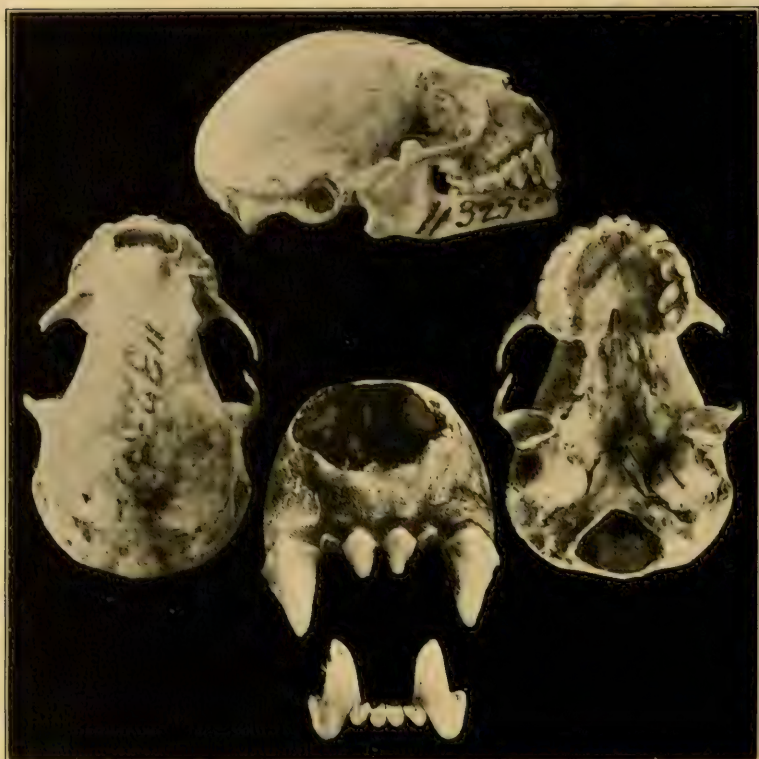


FIG. 157. PHYLLOPS FALCATUM.

No. 113250 U. S. Nat. Mus. Coll.

Enlarged $2\frac{1}{2}$ times. Face view enlarged 6 times.

Genl. Char. Skull has frontal flattened; palate emarginate, the sides converging and forming an angle; second upper molar barely three-fourths the size of first; posterior nose-leaf abruptly narrowed at tip, acutely pointed; fur woolly.

Color. Sooty gray, lightest on under parts; small white patch at anterior point of the origin of each antebrachial membrane; no facial streaks; ears and membranes pale brown.

Measurements. Length of head and body, 48.2; forearm, 41.9;

thumb, 10; third finger, metacarpal, 38; fourth finger, metacarpal, 38; fifth finger, metacarpal, 38; tibia, 15.2; foot, 10; ear, 15.2; tragus, 5.5. Skull: greatest length, 19; occipito-nasal length, 16; zygomatic width, 12; interorbital constriction, 5; width of braincase, 9; palatal length, 3.5; Hensel, 14; length of upper molar series, 4.5; length of mandible, 11.2; length of lower molar series, 5.

166. Ectophylla.

Dental formula unknown.

Ectophylla H. Allen, Proc. U. S. Nat. Mus., xv, 1892, p. 441, 2 figs. text. Type *Ectophylla alba* H. Allen.

"Nose-leaf erect, basal part notched in middle of free margins; nostrils separated by a small rounded nodule; auricle simple, erect,



FIG. CXXX. ECTOPHYLLA ALBA.
ex Proc. U. S. Nat. Mus. 1½ times nat. size.

ovate; external basal lobe convex and slightly thickened, internal rounded, free; tragus half the height of auricle, moderately convex on inner margin, irregularly convex on outer, and with two coarse serrations near base; chin with eight (?) marginal rounded warts, and one median behind; interfemoral membrane, a broad hem to the

inferior extremity and pubis; tail absent; tip of calcareus projecting; wing membranes midway between ankles and base of metatarsi; first phalanx shorter than second; first phalanx of third finger one-third the length of metacarpal; fifth metacarpal long as forearm; phalanx of second digit one-fourth the metacarpal." (Allen, l. c.) Specimen mutilated and without skull.

670. alba (*Ectophylla*), H. Allen, Proc. U. S. Nat. Mus., xv, 1892, p. 442, figs. 1, 2.

WHITE HONDURAS BAT.

Type locality. Segovia River, Eastern Honduras?

Geogr. Distr. Honduras, Central America?

Genl. Char. Those of the genus. Interfemoral membrane naked.

Color. Above dullish white to the shoulder, remainder has the hairs whitish tipped with fawn; beneath whitish; flanks dark fawn.

Measurements. Head and body, 36; forearm, 25; first finger, metacarpal, 3; second finger, metacarpal, 21; third finger, metacarpal, 25; fourth finger, metacarpal, 25; fifth finger, metacarpal, 25; tibia, 10; foot, 8; ear, 10; tragus, 5.5.

167. Chiroderma.

$$I_{1-1}^{2-2}, \text{ or } \frac{2-2}{2-2}; C_{1-1}^{1-1}; P_{2-2}^{2-2}; M_{2-2}^{2-2}, \text{ or } \frac{2-2}{3-3} = 26 \text{ or } 30.$$

Chiroderma Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1860, p. 747. Type *Chiroderma villosum* Peters.

In general characters similar to *Vampyrops*, but with a shorter muzzle and more developed interfemoral membrane; tooth formula also different. In immature specimens a deep cleft between nasals from their opening to between orbits backward; upper middle incisors slender, their cusps directed inward; first upper premolar with an oblique cusp; first lower premolar with or without a distinct cusp.

671. salvini Dobson, Cat. Chiropt. Brit. Mus., 1878, p. 532, pl. 29, fig. 3, 3a.

SALVIN'S LEAF-NOSED BAT.

Type locality. Costa Rica.

Geogr. Distr. Costa Rica. Range unknown.

Genl. Char. Nose-leaf horseshoe-shaped, free in front and on sides, and with a projection from center of anterior margin; eyes large; outer upper incisors very small; lower incisors small, slightly grooved

on the crowns, last lower molar large; first lower premolar with a flat oval crown, and without a distinct cusp; other characters those of the genus.

Color.—Above dark brown, the hairs being brown at base, then



FIG. 158. *CHIRODERMA SALVINI*.

No. 22849 U. S. Nat. Mus. Coll.

Twice nat. size. Incisors enlarged 4 times.

pale yellowish brown, then dark brown, beneath, hairs brown with ash-colored tips, four broad white streaks on head.

Measurement.—Length of head and body, 71; height of nose-leaf, 11; forearm, 50.8; thumb, 10; third finger, metacarpal, 45.7; fourth finger, metacarpal, 41.4; fifth finger, metacarpal, 43.4; blue



FIG. CXXXI. CHIRODERMA SALVINI.

No. 1793 Acad. Nat. Sci. Phil. Coll.

16.51; foot, 10; ear, 17.7; tragus, 6.8. Skull: occipito-nasal length, 23; zygomatic width, 16; mastoid breadth, 12; palatal length, 9.5; width of palate between last molars, 5; length of mandible, 18.

168. Pygoderma.

$$I_{\frac{2}{2}}^{\frac{2}{2}}; C_{\frac{1}{1}}^{\frac{1}{1}}; P_{\frac{2}{2}}^{\frac{2}{2}}; M_{\frac{2}{2}}^{\frac{2}{2}} = 28.$$

Pygoderma Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1863, p. 83, and 1865, p. 357. Type **Phyllostoma bilabiatum* Wagner.

Muzzle short, obtuse; facial part of skull elevated anteriorly; upper incisors straight, conical, the central pair unicuspidate, triangular, with small basal projection externally on cingulum; outer incisors very small, level with the gums; crowns flat, occupying space between middle incisors and canines; lower incisors grooved, placed in line between canines; posterior lower molar one-third the size of first molar; ears and nose-leaf similar to those of *Artibeus*. A ridge from angle of mouth backward, naked.

672. bilabiatum (*Phyllostoma*), Wagn., in Weigm., Archiv. f. Naturg., ix, 1843, bd. 1, p. 366.

leucomus (*Artibeus*!) Gray, Proc. Zool. Soc., 1848, p. 57.

microdon Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1863, p. 83.

*Under this genus Peters l. c. gives three species, *P. bilabiatum*, Wagner, *Artibeus leucomus* Gray, and *Pygoderma microdon* Peters, in the order named. If the species first given is to be selected, *bilabiatum* is the type. Palmer gives the last named, *microdon*, as the type. (Ind. Gen. Mamm., 1904, p. 599.)

YPANEMA NOSE-LEAF BAT.

Type locality. Ypanema, San Paulo, Brazil

Geogr. Distr. Mexico to Brazil.

Genl. Char. Those of the genus.



FIG. 159. PYGODERMA BILABIATUM.

No. 37502 U. S. Nat. Mus. Coll. Enlarged 5 times.

Color. Above dark brown, also at base of hairs; pale buff between, under parts grayish brown; small patch of white on shoulder; forearm above, wing membrane between humerus and forearm, and legs to ankles covered with fur.

Measurements. Length of head and body, 61; forearm, 28; thumb, 12.7; third finger, metacarpal, 35.5; fourth finger, metacarpal, 35.5;



FIG. CXXXII. PYGODERMA BILABIATUM.

No. 105685 U. S. Nat. Mus. Coll.

fifth finger, metacarpal, 36.8; tibia, 16.5; foot, 11.4; ear, 17.7; tragus, 7.1. Skull: length of mandible, angle to symphysis, 11.5; height at condyle, 2; at coronoid process, 5; length of lower molar series, 4; width between molar series, inside, 3. Skull too badly broken for other measurements.

169. *Sturnira*.

$$I_{2-2}^{2-2}, C_{1-1}^{1-1}, P_{2-2}^{2-2}, M_{3-3}^{3-3} = 32.$$

Sturnira Gray, Ann. Mag. Nat. Hist., 1st Ser., x, 1842, p. 257. Type

Sturnira spectrum Gray = *Phyllostoma lilium* E. Geoffroy.

Nyctiplanus Gray, Proc. Zool. Soc., 1848, p. 57.

Muzzle conical; chin with three warts margined beneath by smaller warts; tail, none; wing membrane reaching ankles; inter-femoral membrane narrow; tufts of variously colored hairs over glands on the sides of neck in the male; upper middle incisors unicuspidate, oblique; molars narrow, longitudinally grooved.



FIG. 160. *STURNIRA LILIUM*.

No. 37324 U. S. Nat. Mus. Coll.

Twice enlarged. Incisors enlarged 5 times.

673. *lilium* (*Phyllostoma*), Geoff., Ann. Mus. Hist. Nat. Paris, xv, 1810, p. 181.

spiculatus Illig., Licht. Verz. der Doubl., p. 3.

spectrum Gray, Ann. Mag. Nat. Hist., 1st Ser., 1842, p. 257.

excisum Wagn., in Wiegman, Archiv. f. Naturg., 1842, p. 358.

albescens Wagn., Abhandl. Münch. Akad., v, p. 178.

erythromos Tschudi, Faun. Peruana, 1844-46, p. 64, pl. 1.

oporaphilum Tschudi, Faun. Peruana, 1844-46, p. 64, pl. 1.

chilense Gerv., Gay, Hist. Chili. Mamm., 1847, p. 30, pl. 1, fig. 1.

rotundatus Gray, Proc. Zool. Soc., 1848, p. 57.

chrysocomus Wagn., Suppl. Schreb. Säugeth., v, 1855, p. 635.

lilium Allen, Bull. Am. Mus. Nat. Hist. N. Y., 1890, p. 181.



FIG. CXXXIII. STURNIRA LILIUM.

No. 8209 U. S. Nat. Mus. Coll. Twice nat. size.

GEOFFROY'S BAT.

Type locality. Paraguay.

Geogr. Distr. States of Jalisco and Vera Cruz, Mexico, to Paraguay and Chili. West Indies.

Genl. Char. Those of the genus.

Color. Adult Male. Dorsal region dark brown, base of hairs yellowish white, and tips reddish; head, neck and shoulders yellowish brown; under parts grayish brown tinged with reddish; throat paler, on each side of neck a tuft of brownish red hairs with golden red tips.

Adult Female. Dorsal region dark brown; rest of upper parts grayish brown; under parts paler generally; belly whitish tinged with red.

Measurements. Length of head and body, 61; forearm, 43; thumb, 11.4; third finger, metacarpal, 39.3; fourth finger, metacarpal, 40.6;

fifth finger, metacarpal, 40.6; tibia, 16.5; foot, 12.7; ear, 17.7; tragus, 7. Skull: occipito-nasal length, 20; zygomatic width, 13; height of braincase at bulge, 10; palatal length, 8; length of mandible, 13.

Subfam. V. **Centurioninæ.**

170. Centurio.

$I \frac{1}{1}$; $C \frac{1}{1}$; $P \frac{1}{1}$; $M \frac{2}{2} = 28$

Centurio Gray, Ann. Mag. Nat. Hist., 1st Ser., x, 1842, p. 250. Type
Centurio senex Gray

Trichocorys H. Allen, Proc. Acad. Nat. Scien., Phila., 1861, p. 351



FIG. 161. *CENTURIO SENEX*.
No. 37786 Coll. Acad. Nat. Scien. Phil.
Enlarged 2½ times. Nose view enlarged 3 times.

Muzzle short and broad anteriorly; face with numerous naked raised ridges; under side of lower jaw and throat with transverse cutaneous bands; no nose-leaf; nostrils in concavity at end of muzzle formed by a division in upper lip, and are separated by a flat, naked, straight-sided elevation in the center; ear conch divided internally; throat with transverse folds of skin; rostral portion of skull very broad; upper canines with anterior basal concavity; posterior upper molar smaller than first; lower incisors very small, grooved; upper middle incisor broad at base, cusp short; wings extending to metatarsi; interfemoral membrane well developed, emarginate behind, extending above middle of tibia.



FIG. CXXXIV. CENTURIO SENEX. OLD MALE.

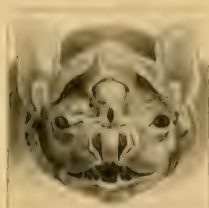


FIG. CXXXV. CENTURIO SENEX. YOUNG.
ex Dobson, Cat. Chiroptera.

674. *senex* (*Centurio*), Gray, Ann. Mag. Nat. Hist., 1st Ser., x, 1842, p. 259. Rehn, Proc. Acad. Nat. Scien. Phil., 1901, p. 297.
flavogularis Licht. & Peters, Monatsb. K. Preuss. Akad. Wiss. Berl., 1854, p. 335.
mexicanus Sauss., Rev. & Mag. Zoöl., 2me Sér., xii, 1860, p. 381.
macmurtri H. Allen, Proc. Acad. Nat. Scien. Phil., 1861, p. 360.
 (Adult Male.)
minor Ward, Am. Nat., xxv, 1891, p. 750. (Female.)

WRINKLED-FACE BAT.

Type locality. Unknown.

Geogr. Distr. Eastern Mexico, State of Vera Cruz, into Central America to Costa Rica. Limits of range not determined.

Genl. Char. Those of the genus.

Color. Yellowish brown, tips of hairs grayish; a white spot on shoulder.

Measurements. Length of head and body, 50.5-75; forearm, 40-53; thumb, 10-12.5; third finger, 80-93; fourth finger, 60; fifth finger, 42; tibia, 16-20.5; foot, 10-11; ear, 11-16.5; tragus, 3.5-7.5. Skull: total length, 17; zygomatic width, 14.7; interorbital width, 5; height of braincase, 11.5; palatal length to incisive foramina, 3.

The Desmodont group contains but two genera, comprising the species of blood-sucking bats, the real Vampires, whose teeth and alimentary canal are modified so as to be adapted to their food.

Subfam. VI. **Desmodontinæ.****171. Desmodus.**

$$I. \frac{1}{2} \frac{1}{2}; C. \frac{1-1}{1-1}; P. \frac{2-2}{3-3}; M. \frac{0-0}{0-0} = 20.$$

Desmodus Wied, Abbild. Naturgesch. Brasil., 5te Lief., 1824, pl. 1d. Beitr. Natur. Bras., 11, 1826, p. 231. Type *Desmodus rufus* Wied = *Phyllostoma rotundum* Geoffroy.

Muzzle short, conical; nose-leaf distinct; nostrils opening on its surface, and numerous ridges bounding it behind; deep V-shaped groove on lower lip extending to chin; ears separate, short; tragus longer than broad, acute; upper incisors large, their longest side concave, sharp; canines smaller than incisors; lower incisors small, bifid, with a space between them and the canines, and also between them in front; premolars small; interfemoral membrane not extending to heels; no calcaneum; no tail.

675. rotundus (*Phyllostoma*), E. Geoff., Ann. Mus. Hist. Nat., 1810, p. 181.

ecaudatus (*Rhinolophus*), Schinz, Thiere., 1, 1821, p. 168.

rufus (*Desmodus*), Wied, Beitr. Naturg. Bras., 1826, p. 233.

cinerea D'Orbigny, Voy. de l'Amér. Mérid., iv, 1847, p. 11, pl. VIII.

d'orbignyi Waterh., Voy. Beagle, Mamm., 1839-42, p. 1, pls. 1 and xxxv, fig. 1.



FIG. 162. DESMODUS ROTUNDUS.
No. 7042 Field Columbian Mus. Coll.
Twice nat. size. Incisors enlarged 4 times.

murinus et rufus Wagn., Schreb. Säugeth. Suppl., I, 1847, pp.
377-380.

juscus Lund., Burm. Thiere Bras., 1854, p. 57.

RUFIOUS VAMPIRE BAT.

Type locality. Paraguay.

Geogr. Distr. Southern Mexico south to Chili and Paraguay.



FIG. CXXXVI. DESMODUS ROTUNDUS.
No. 7042 Field Columbian Mus. Coll. Nat. size

Genl. Char. Those of the genus.

Color. Above dark rufous brown, base of hairs whitish; under parts pale gray or whitish.

Measurements. Length of head and body, 76.2; forearm, 63.5; third finger, metacarpal, 53.3; fourth finger, metacarpal, 63.5; ear, 19; tragus, 7.6; tibia, 38; foot, 15.2. Skull: occipito-nasal length, 20; zygomatic width, 11; interorbital width, 5.5; mastoid breadth, 12.5; height of braincase at bullæ, 12; palatal length, 7.5; length of mandible, 14.

172. *Diphylla*.

$$I. \frac{4-1}{4-4}; C. \frac{1-1}{1-1}; P. \frac{2-2}{3-3}; M. \frac{1-1}{1-1} = 34.$$

Diphylla *Spix, Simiar. et Vespert. Bras., 1823, p. 68. (nec Oken Mollusca, 1817.) Type *Diphylla ccaudata* Spix.

Hæmatonycteris H. Allen, Proc. U. S. Nat. Mus., XVIII, 1896, p. 777. Type, *Diphylla ccaudata* Dobson. (nec Spix.)

Muzzle flat, square, not separated inferiorly from lip; raised transverse ridge behind muzzle; lower lip indistinctly cleft; auricle with both internal and external basal lobes; tragus abruptly acuminate, thickened near apex; interfemoral membrane rudimental; middle pair of upper incisors very large, outer exceedingly minute; lower incisors pectinate, central pair larger than outer; premolars compressed, with knife-like edges, the first on lower jaw twice the size of the second, and the third more than twice the size of first; upper molar minute. Spec. ex Mexico.

KEY TO THE SPECIES.

	PAGE
A. Under parts gray <i>D. ccaudata</i> (Spix?)	720
B. Under parts seal brown <i>D. centralis</i>	721

676. *ccaudata* Spix, Simiar. et Vespert. Bras., 1823, p. 68, pl. xxxvi. H. Allen, Proc. U. S. Nat. Mus., XVIII, 1896, p. 769. (nec Spix?.)

TAILLESS BAT.

Type locality. Brazil.

Geogr. Distr. Southern Mexico?. Brazil.

Genl. Char. Those of the genus.

Color. Sides of neck and the back fawn color; shafts of hair nearly white; under surface gray, base of fur white; triangular space of gray

*Spix's specimen in the number of its molars, $\frac{4-4}{4-4}$, may be abnormal; but if not, it belongs to a different genus from the species described by Dr. H. Allen, from Mexico.

hair on wing membrane; face nearly naked, a pencil of hair between eye and nose-leaf; arm and forearm furred nearly to the wrist.

Measurements. Length of head and body, 66; forearm, 50.8; third finger, metacarpal, 50.8; fourth finger, metacarpal, 50.8; fifth finger, metacarpal, 49.5; ear, 16.5; tragus, 7.6; tibia, 17.7; foot, 13.9. Skull: occipito-nasal length, 20; zygomatic width, 7; interorbital width, 8; height of braincase at bullæ, 12; mastoid width, 12; palatal length, 6; length of mandible, 14.



FIG. 163. *DIPHYLLA ECAUDATA*.

No. 37338 U. S. Nat. Mus. Coll. ex Orizaba, Mexico

Twice nat. size. Incisors enlarged 5 times.

677. *centralis* (*Diphylla*), Thomas, Ann. Mag. Nat. Hist., 7th Ser
XI, 1903, p. 378.

BOQUETE TAILLESS BAT.

Type locality. Boquete, Chiriqui, Panama. Altitude, 4,500 feet.

Genl. Char. Like *D. ecaudata*; legs less heavily haired, less white on digits and tips of wings; skull more round and less sharply arched above; interorbital region narrower; zygomata more widely and evenly spread; bullæ larger and higher; third and fourth lower premolars

and first molar subequal; lower canine shorter, with a more strongly marked posterior basal ledge.

Color. Back and belly seal brown, neck and shoulders lighter, broad base of hairs white.

Measurements. Head and body, 87; ear, 15; forearm, 54; third finger, metacarpal, 54; first phalanx, 11; second phalanx, 28. Skull: greatest length, from tip of incisors, 22.8; basal length, 17.2; zygomatic breadth, 12.6; breadth of braincase, 11.3; palate length, 7; postpalatal length, 10.2. (Thomas, l. c.)

Order XI. **Primates. Primates.**

Sub. Order. **Anthropoidea.**

Fam. I. †**Callitrichidae. Marmosets.**

The Marmosets are the smallest members of the tribe of Monkey, and comprise the lowest group of the suborder. They are confined to the New World, and in size are not larger than many species of squirrels, are arboreal in habits, associate in small companies and live on fruits and insects. They are covered with rather long, thick and soft fur and the color varies greatly. The ears of some are decorated with long fringes, others have large whiskers, and others heavy manes. The digits have claws instead of nails on all except the hallux, or great toe, which possesses a nail. As many as three young are often brought forth, thus greatly exceeding the normal number for the Order. They are not very hardy animals, and easily succumb if carried into a cold climate.

173. **Midas.**

$$I. \frac{2-2}{2-2}; C. \frac{1-1}{1-1}; P. \frac{3-3}{3-3}; M. \frac{2-2}{2-2} = 32.$$

Midas Geoff., Ann. Mus. Hist. Nat. Paris, XIX, 1812, p. 120. Type
Simia midas Linnæus.



FIG. 164. MIDAS GEOFFROYI.

No. 37794 Coll. U. S. Nat. Mus. Nat. size

†See O. Thomas, Ann. Mag. Nat. Hist., 7th Ser., XII, 1903, p. 457

Marikina Reich., Vollstand. Naturg. Affen. 7-9, 1862, pl. 11, figs. 25-31.

Seniocebus Gray, Cat. Monkeys, Lemurs, and Fruit-eating Bats, Brit. Mus., 1870, p. 68.

Lower canines longer than incisors; external bony auditory meatus wanting; no cheek pouches; pollex not opposable to rest of digits; hallux alone possessing a nail.

678. *geoffroyi* (*Hapale*), Puch., Rev. Zoöl., VIII, 1845, p. 336.
adipus Schat., Nat. Hist. Rev., 1861, p. 509. (nec Linn.)

GEOFFROY'S TITI MONKEY.

Type locality. Panama.

Geogr. Distr. Panama to Columbia.



FIG. CXXXVII. MIDAS GEOFFROYI.

Genl. Char. Size small; nape rufous; no lengthened white occipital crest.

Color. Top of head white, rest of head and face lead color; nape and hind neck rufous, upper parts and sides yellowish brown, becoming rufous on rump; under parts, limbs, hands, and feet white; tail, basal portion rufous, remainder black.

Measurements. Total length, 570; tail vertebrae, 310 (mounted specimen). Skull: occipito-nasal length, 59; zygomatic width, 38; width of orbit, 17.5; length of nasals, 10; width of frontals, 26; palatal length, 16; palatal arch to end of hamular process, 10; width of hamular process, 9; length of mandible, 37; height at condyle, 22.5.

In the next family are found the typical members. They are inhabitants of tropical America, in whose vast forest regions they abound, Brazil probably possessing the largest number of species. Those of the genus *CEBUS*, known as the Sapajous or Capuchins, are probably familiar to a greater number of people than any other of the monkey tribe, and are more often seen in captivity. They are among the most intelligent of the New World Monkeys, are playful, mischievous in the highest degree, and tricky. They go in troupes, following each other in single file through the forest trees, steadying themselves amid the branches by hands and tail, taking a firm hold of any object with the latter by means of the prehensile end.

Fam. II. **Cebidæ. Prehensile-tailed Monkeys.**

Skull round; no external auditory meatus; frontal sinuses large; internarial septum broad; legs, arms, and tail very long; tail sometimes prehensile; nails on all the digits.

Subfam. I. **Alouattinæ.**

Digits with nails; tail prehensile, naked distally beneath; pollex well developed.

The Howling Monkeys, as the species of the next genus are called, are remarkable, as may be supposed from their names, for their extremely powerful voices, which cause the forest to resound with their cries in the mornings and evenings. They are heavy in form, with strong prehensile tails, sullen in disposition, and practically untamable. They keep in the tops of the highest trees, and feed on

leaves and fruits. They vary wonderfully in color, both among individuals and between the sexes, while some of the races, separated on the hues of the fur, or difference in size, have a precarious and unsatisfactory scientific standing. In intelligence these monkeys have a very low rank. The species associate in small groups, and the habits do not apparently vary among the recognized forms. They range from Central America to southern South America.

174. *Alouatta*. Howling Monkeys.

$$I. \frac{2-2}{2-2}; C. \frac{1-1}{1-1}; P. \frac{3-3}{3-3}; M. \frac{3-3}{3-3} = 36.$$

Alouatta Lacépède, Tabl. Ordres et Genres Mamm., 1799, p. 4.

Type *Simia belzebul* Linnæus.

Myctes Illig., Prodr. Syst. Mamm. Av., 1811, p. 70.

Occipital region of skull truncate; rami of mandible enormously developed; hyoid greatly inflated; lower incisors vertical, canines powerful; claws convex, strong.

KEY TO THE SPECIES.

	PAGE
A. Upper parts black, beneath black.	<i>A. villosa</i> 726
B. Upper parts yellowish brown, varying in extent.	
a. Size large.	<i>A. palliata</i> 726
b. Size small.	<i>A. p. mexicana</i> 727
c. Size very small.	<i>A. p. coibensis</i> 727

679. *villosa* (*Myctes*), Gray, Ann. Mag. Nat. Hist., 1st Ser., xvi, 1845, p. 220.

VILLOUS HOWLER. *Mono* in Guatemala.

Type locality. Brazil.

Geogr. Distr. Guatemala and Honduras, Central America, into South America.

Color. Uniform black; hairs beneath ears brownish at base.

Measurements. Total length, 1650; tail, 630; foot, 128.

680. *palliata* (*Myctes*), Gray, Proc. Zool. Soc., 1848, p. 138, pl. vi. **MANTLED HOWLER.** *Congo* in Costa Rica; *Congo*, o' *Mono Chillon* in Nicaragua.

Type locality. Caracas, Venezuela.

Geogr. Distr. Nicaragua to South America.

Genl. Char. Hair of forehead forming a slight crest; beard slight.

Color. Very variable. Black; middle of back and upper part of



ALOUATTA VILLOSA.

No. 140 Am. Mus. Nat. Hist. Coll. About $\frac{2}{3}$ nat. size.

sides bronze yellow brown, hairs tipped with black; lower part of sides brownish yellow; tail black; hands and feet black; under parts sparsely covered with brown hairs. The depth of the black or blackish brown general color, and the space covered by yellowish brown or fulvous on back and loins varies considerably.



FIG. CXXXVIII. *ALOUATTA PALLIATA*. MANTLED HOWLER.

Measurements. Total length, 1142; tail vertebrae, 585; hind foot, 145 (skin).

a.—mexicana (*Alouatta*), Merr., Proc. Biol. Soc. Wash., 1902, p. 67.
MEXICAN HOWLER.

Type locality. Minatitlan, State of Vera Cruz, Mexico.

Geogr. Distr. Eastern Mexico.

Genl. Char. Like *A. palliata*, but smaller; rostrum narrower; zygoma without the "hump" on upper side posteriorly; coronoid process broadly rounded; teeth small.

Color. Similar to *A. palliata*.

Measurements. Total length, 1190; tail vertebrae, 651; hind foot, 148. (Merr., ex Type.)

b.—coibensis (*Alouatta*), Thomas, Novitat. Zool., ix, 1902, p. 135.

ISLAND OF COIBA HOWLER.

Type locality. Coiba Island, off west coast of Panama.

Genl. Char. Similar to *A. palliata*, but smaller; zygomata proportionally more expanded. A small insular race.

Color. Like *A. palliata*.

Measurements. Head and body, 560; tail, 580; foot, 130. Skull: greatest length, 104.5; basal length, 86.5; zygomatic breadth, 79.5; nasals, median length, 15.3; anterior width, 13.5; least width, 7.5; interorbital breadth, 11; palatal length, 53; length of upper tooth row (molars and premolars), 33; condyle to angle of mandible, 62; antero-posterior diameter of ascending ramus, 30.

Subfam. II. **Aotinæ. Squirrel Monkeys.**

Size small; tail non-prehensile; muzzle not prominent; habits nocturnal.

175. *Aotus.

$$I. \frac{2-2}{2-2}; C. \frac{1-1}{1-1}; P. \frac{3-3}{3-3}; M. \frac{3-3}{3-3} = 36.$$

Aotus Humboldt, Recueil d'obs. Zoöl. et Anat. Comp., 1, 1811, p. 358. Type *Simia trivirgata* Humboldt.

Nyctipitheccus Spix, Sim. et Vesp. Bras., 1823, p. 25.

Head round; orbits large; nasal septum narrow; nostrils approximate.



FIG. 165. *AOTUS AZARÆ*.

No. 37793. Coll. U. S. Nat. Mus. Nat. size.

*To illustrate this genus, no skull of a Central American species being available, that of a South American species is given.

KEY TO THE SPECIES.

A. Upper parts ashy tinged with rufous, beneath rufous.....	<i>A. rufipes</i>	729
B. Upper parts pale brown, beneath ochraceous...	<i>A. vociferans</i>	729



FIG. CXXXIX. AOTUS RUFIPES.

681. rufipes (*Nyctipithecus*), Sclat., Proc. Zool. Soc., 1872, p. 3.

RUFIOUS-FOOT SQUIRREL MONKEY.

Type locality. San Juan del Norte, Nicaragua.

Geogr. Distr. Nicaragua. Limits of range unknown.

Genl. Char. Colors pale; hands and feet rufous.

Color. Upper parts ashy tinged with rufous, under parts rufous; three black stripes on head, one from between eyes to forehead, and one on each side to above ears; hands and feet rufous; tail rufous at base, becoming blackish at tip.

Measurements. Total length, 685; tail, 405.

682. vociferans (*Nyctipithecus*), Spix, Sim. et Vespert. Bras., 1823, p. 25, pl. 19.

NOISY SQUIRREL MONKEY. *Mico-dormilon* in Colombia.

Type locality. Tabatinga, Upper Amazon, Brazil.

Geogr. Distr. Costa Rica, Central America, to Brazil.

Color. Space around eyes and nose naked, brown; a dark brown stripe from side of crown encircles the eyes; white band above eyes; a blackish brown spot on forehead; sides of neck black; upper parts pale brown; tail ferruginous at base, grading into blackish on apical third; throat, breast, and abdomen ochraceous.

Measurements. Total length, 950; tail, 530.

176. Saimiri.

$$I. \frac{2-2}{2-2}; C. \frac{1-1}{1-1}; P. \frac{3-3}{3-3}; M. \frac{3-3}{3-3} = 36.$$

Saimiri Voigt, Cuvier's Thierreich, I, 1831, p. 95. Type *Simia sciurea* Linnæus.

Chrysothrix Kaup, Thierr., I, 1835, p. 51, fig.

Occipital region of skull prolonged backward; orbits large, close together; canines large; tail non-prehensile, covered with hair.



FIG. 166. SAIMIRI ØERSTEDI.
No. 10130 Coll. Mus. Comp. Zoöl. Nat. size

683. *ærstedii* (*Chrysothrix*), Reinh., Vidensk. Medd. Nat. For. Kjöb., 1872, p. 157. pl. III.
sciurea Sclat., Nat. Hist. Rev., 1861, p. 510. (nec Linn.)
entomophaga Sclat., Proc. Zoöl. Soc., 1872, p. 3. (nec D'Orbigny.)



FIG. CXL. SAIMIRI ÆRSTEDI.

OERSTED'S TITI MONKEY. *Titi*, *Cuistiti* in Costa Rica.

Type locality. Cartago, Costa Rica.

Geogr. Distr. Guatemala to Panama, Central America.

Genl. Char. Similar to *S. sciurea*.

Color. Face, ears, neck, and breast white; muzzle and region round mouth lead color; top of head and occiput black; upper parts red, shading into golden yellow on the sides; shoulders and arms above elbow gray mottled with yellowish; lower arms, hands, and feet golden yellow; thighs greenish gray, as is also the tail for two-thirds its length, when it grades into black for the apical portion.

The Spider Monkeys are remarkable for the length of their limbs, which causes them to be extremely awkward on the ground, and it is questionable, if in the wild state they often leave the trees upon which they live. The tail is prehensile and is a most valuable adjunct in their movements, serving as an extra hand, for it grasps as firmly as that member can any object within reach. Being long and very flexible, it is often employed to bring branches within reach of the hands, and it can easily sustain the entire weight of the animal. There is quite a number of species, very variable in coloring, distributed from eastern Mexico to southern South America.

Subfam. III. **Cebinae.**

177. Ateles. Spider Monkeys.

$$I. \begin{smallmatrix} 2-2 \\ 2-2 \end{smallmatrix}; C. \begin{smallmatrix} 1-1 \\ 1-1 \end{smallmatrix}; P. \begin{smallmatrix} 2-2 \\ 2-2 \end{smallmatrix}; M. \begin{smallmatrix} 3-3 \\ 3-3 \end{smallmatrix} = 32.$$

Ateles E. Geoff., Ann. Mus. Hist. Nat., Paris, VII, 1806, p. 262.

Type *Simia paniscus* Linnæus.

Body slender; limbs slender, long; pollex rudimentary or absent;



FIG. CXLI. *ATELES VELLEROSUS*.



ATELES VELLEROSUS.

Coll. Am. Mus. Nat. Hist. $\frac{3}{4}$ nat. size.

tail beneath distally, naked; fur not woolly; middle incisors long, broad; molars small, rounded.

KEY TO THE SPECIES.

A. Limbs and tail long, body slender.

a. Upper parts black.	PAGE
a.' Under parts grayish white. <i>A. vellerosus</i>	733
b.' Under parts rusty red. <i>A. geoffroyi</i>	733
c.' Under parts deep fulvous. <i>A. rufiventris</i>	734
d.' Under parts white. <i>A. ater</i>	734
b. Upper parts grizzled black and silvery gray, under parts grayish. <i>A. griseus</i>	734

684. *vellosus* (*Ateles*), Gray, Proc. Zool. Soc., 1865, p. 733.

fuliginosus Schleg., Mus. Pays-Bas., III, 1876, p. 179. (nec Kuhl.)

pan Schleg., Mus. Pays-Bas., III, 1876, p. 180.

MEXICAN SPIDER MONKEY.

Type locality. Unknown.

Geogr. Distr. Volcano of Orizaba, State of Vera Cruz, south to Guatemala, Central America.

Genl. Char. Those of the genus. Fur long, spreading.

Color. Head, limbs, hands, and feet exteriorly, and tail, black; loins and sides golden brown; under parts grayish or yellowish white.

Measurements. Total length, 1310; tail vertebræ, 832; hind foot, 183. Skull: occipito-nasal length, 93; zygomatic width, 65; Hensel, 59; palatal length, 27; width of pterygoid fossa at hamular processes, 26; length of upper molar series, 23; length of mandible, 50; height at condyle, 38; length of lower molar series, 26.

685. *geoffroyi* (*Ateles*), Kuhl, Beit. Zool., 1820, p. 26.

melanochir Desm., Mamm., 1820, p. 76.

frontatus Gray, Ann. Mag. Nat. Hist., 1st Ser., x, 1842, p. 256.

hybridus Gray, Cat. Monkeys, etc., Brit. Mus., 1870, p. 43.

ornatus Gray, Cat. Monkeys, etc., Brit. Mus., 1870, p. 44.

albifrons Gray, Cat. Monkeys, etc., Brit. Mus., 1870, p. 44.

variegatus Frantzius, in Weigm., Arch. f. Naturg., xxxv, 1, p. 257. (nec Wagn.)

GEOFFROY'S SPIDER MONKEY. *Mono Colorado* in Costa Rica.

Type locality. Unknown. Type specimen in Museum of Paris.

Geogr. Distr. Nicaragua in Central America to Colombia, South America.

Color. Very variable. Light grayish drab; hands, feet, elbows, and knees black; face black, mouth flesh color; patch of erect black

hairs on forehead; tail tinged with buff on upper part. This is the *A. melanochir* style. Darker style has the body above and below, back of thighs, and base of tail rusty red; hands, feet, tail, except base, arms, fore part of hind legs, and lower part of shoulder black; face black; whiskers buffy; top of head blackish, with a buff spot on forehead.

Measurements. Total length, 950; tail, 525.

686. rufiventris (*Ateles*), Sclat., Proc. Zoöl. Soc., 1872, p. 688, pl. LVII, juv.

FULVOUS-BELLIED SPIDER MONKEY.

Type locality. Colon. Atrato River, northern Colombia.

Geogr. Distr. Panama? into Colombia, South America.

Genl. Char. Hair rough, upstanding, projecting on forehead; no external thumbs.

Color. Face and muzzle flesh color; belly deep fulvous, rest of pelage black.

Measurements. The type was an immature individual.

687. ater (*Ateles*), F. Cuv., Hist. Nat. Mamm., 2d ed., III, 1823, Livr. XXXIX, p. 107, pl. 56.

BLACK SPIDER MONKEY.

Type locality. Cayenne, French Guiana.

Geogr. Distr. Panama to eastern Peru.

Color. Black; upper part of back brownish, lower part and sides fulvous; under parts and inner sides of limbs white; tail black.

Measurements. Total length, 875; tail, 475.

688. grisescens (*Ateles*), Gray, Proc. Zoöl. Soc., 1865, p. 732.

GRIZZLED SPIDER MONKEY.

Type locality. Unknown. Type specimen in British Museum.

Geogr. Distr. Central America.

Genl. Char. Fur moderately long; no thumb.

Color. "Fur moderately long, black, with many silvery white hairs interspersed; tail black; under side grayish; hair of the forehead moderately long." (Gray, l. c.)

Top of head, nape, back of neck, fore part of shoulders, arms, hands, legs, and feet black; rest of body and limbs silvery gray mixed with black hairs; tail silvery gray mixed with black hairs like back, tip black; face black. (Specimen in Collection of Am. Mus. Nat. Hist., New York.)

Measurements. Total length, 1265; tail vertebræ, 775; hind feet, 170. (Mounted Specimen, A. M. N. H., N. Y.)

178. *Cebus*.

$$I. \frac{2-2}{2-2}; C. \frac{1-1}{1-1}; P. \frac{3-3}{3-3}; M. \frac{3-3}{3-3} = 36.$$

Cebus Erxl., Syst. Règn. Anim., 1777, 1, p. 44. Type—?

Form rather robust, much stouter than that of the members of



FIG. 167. *CEBUS HYPOLEUCUS*.

No. 4520 Coll. Field Columbian Mus. Nat. size

Ateles, and without the naked under part of the distal portion of the tail; the pollex is well developed; tail long, curled at tip; hair on face short; whiskers present; no crest; canines large; last molar in both jaws the smallest.

KEY TO THE SPECIES.

	PAGE
A. Fore part of head and body white.	
a. Female without elongated frontal tuft <i>C. hypoleucus</i>	736
b. Female with elongated frontal tuft <i>C. imitator</i>	737

689. *hypoleucus* (*Simia*), Humb., Recueil, Obs. Zool. Anat. Comp., I, 1811, p. 337.

WHITE-THROATED CAPUCHIN. *Mono carablanca*.

Type locality. Rio Sinu, Bolivar, Colombia.

Geogr. Distr. Nicaragua to Colombia.

Genl. Char. Tail long, haired throughout, pollex present.



FIG. CXLII. *CEBUS HYPOLEUCUS*.

Color. Skin of face flesh color; forehead, cheeks, sides of head to behind ears, chin, throat, sides of neck, chest and shoulders, extending down arms below elbow, white; rest of body, limbs, hands, feet, and tail glossy black.

Measurements. Total length, 1000; tail, 500; hind foot, 120 (skin). Skull: occipito-nasal length, 86.5; Hensel, 61; zygomatic

width, 60; length of nasals, 16; palatal length, 30; length of upper molar series, 21; length of mandible, 51; height of condyle, 26; at coronoid process, 32; length of lower molar series, 26.

690. imitator (*Cebus*), Thomas, Ann. Mag. Nat. Hist., 7th Ser., XI, 1903, p. 376.

ALLIED SAPAJOU.

Type locality. Boquete, Chiriqui, Panama. Altitude, 4,000 feet.

Genl. Char. Like *C. hypoleucus*, but the female with elongate frontal tufts.

Color. Like *C. hypoleucus*.

Measurements. Total length, 960; tail, 510; hind foot, 123. Skull: greatest length, 91; basal length, 64.5; length of upper cheek teeth, 22.3. (Thomas, l. c.)

APPENDIX.

THE FOLLOWING DESCRIPTIONS WERE PUBLISHED TOO LATE
TO BE INCLUDED IN THEIR PROPER PLACES IN
THE BODY OF THE WORK.

Order VI. **Rodentia.**

Fam. I. **Sciuridae.**

Subfam. I. **Sciurinae.**

34. Sciurus.

F. *Otosciurus.*

79. a.—phæurus (*Sciurus*), Allen, Bull. Am. Mus. Nat. Hist., 1904, p. 205.

LA CIENAGA SQUIRREL.

Type locality. La Cienaga, State of Durango, Mexico.

Genl. Char. Similar to *S. durangi*, but with a gray instead of a reddish back.

Color. Back gray, slightly suffused with reddish; sides of nose gray, sometimes tinged with buff; orbital ring soiled white; black lateral line; tail above and below grizzled gray, broadly fringed with white; ear at base externally pale reddish brown.

Measurements. Total length, 493; tail vertebræ, 222; hind foot, 69.

79bis. barberi (*Sciurus*), Allen, Bull. Am. Mus. Nat. Hist., 1904, p. 207.

BARBER'S SQUIRREL.

Type locality. Colonia Garcia, State of Chihuahua, Mexico.

Genl. Char. Similar to *S. a. phæurus*, but with tail white beneath.

Color. Fall Pelage. Sides of nose and orbital ring soiled white; general color of upper parts gray; broad black lateral line; ventral surface white; upper surface of hands and feet white; tail above black and white mixed, and broadly fringed with white; beneath white except at base; ears slightly rufous at base externally; tufts black.

Measurements. Total length, 500; tail vertebræ, 240; hind foot, 70.

35. Tamias.

A. *Eutamias.*

97bis. canescens (*Tamias*), Allen, Bull. Am. Mus. Nat. Hist., 1904, p. 208.

GUANACEVI CHIPMUNK.

Type locality. Guanacevi, State of Durango, Mexico. Altitude, 8,000 feet.

Genl. Char. Like *T. dorsalis*, but with more strongly defined dorsal stripes and sides a deeper fulvous.

Color. Above gray, suffused with fulvous; median dorsal stripe from crown to base of tail black; lateral dorsal stripes short mixed fulvous, gray, and black; inner pair of light stripes ashy gray, outer whitish gray; sides pale rusty fulvous; tail above mixed gray and black, fringed with whitish gray, beneath in center and on anal region dark orange rufous; stripes on head and the ears, like *T. dorsalis*.

Measurements. Total length, 254; tail vertebræ, 114; hind foot, 35; ear from notch, 19.5. Skull: total length, 38; zygomatic width, 20.

Fam. III. **Muridæ.**

Subfam. I. **Murinæ.**

41. Onychomys.

- 125. c.—yakiensis** (*Onychomys*), Merr., Proc. Biol. Soc. Wash., xvii, 1904, p. 124, June 9.

YAKI MOLE MOUSE.

Type locality. Camoa, Rio Mayo, State of Sonora, Mexico.

Geogr. Distr. Western part of State of Sonora, and northern part of State of Sinaloa.

Genl. Char. Similar to *O. ramona*, but slightly larger; dorsal area darker; molar teeth broader and heavier and palate usually with a median projection.

Measurements. Total length, 154; tail vertebræ, 53; hind foot, 22.5.

- 125. d.—canus** (*Onychomys*), Merr., Proc. Biol. Soc. Wash., xvii, 1904, p. 124, June 9.

HOARY MOLE MOUSE.

Type locality. San Juan Capistrano, State of Zacatecas, Mexico.

Geogr. Distr. States of Zacatecas and San Luis Potosi.

Genl. Char. Similar to *O. torridus*, with longer tail and ears, and color drab gray or grayish clay color instead of fulvous.

Measurements. Total length, 152; tail vertebræ, 55; hind foot, 22.

- leucogaster albescens** (*Onychomys*), Merr., Proc. Biol. Soc. Wash., xvii, 1904, p. 124, June 9.

SAMALAYUCA MOLE MOUSE.

Type locality. Samalayuca, State of Chihuahua, Mexico.

Genl. Char. Similar to *O. l. pallescens*, but paler and with cheeks and thighs snowy white, and a smaller and weaker skull.

Color. Upper parts buffy, deepest on rump; face from nose to eyes whitish washed slightly with buff; cheeks, legs, and thighs snow white like under parts.

Measurements. Total length, 160; tail vertebræ, 60; hind foot, 23.

Fam. IX. **Leporidae.****85. Lepus.****B. Silvilagus.**

429a. insonus (*Lepus*), Nelson, Proc. Biol. Soc. Wash., xvii, 1904, p. 103.

OMILTEME RABBIT.

Type locality. Omilteme, State of Guerrero, Mexico.

Color. Spring pelage. Top of head and back dark ochraceous buffy, grizzled with black; cheeks and sides of rump and body grayer; sides of nose and about eyes buffy gray; nape rusty rufous; neck on sides and beneath dark buffy; rest of under parts white, base of fur bluish; under side of fore legs and tops of feet dingy white, front and sides of fore legs to shoulders tawny ochraceous; front of hind legs and tops of feet dingy whitish, rest of hind legs like sides washed with tawny ochraceous; soles of feet dark smoke brown; tail above dark reddish brown, beneath dingy brownish buffy; ears dark grizzled blackish brown, darkest on anterior border and at tip.

Measurements. Total length, 430; tail vertebrae, 40; hind foot, 93; ear from notch (dried skin), 62. Skull: occipito-nasal length, 75; Hensel, 57; interorbital width, 17.5; parietal width, 26; length of nasals, 31.5; breadth of rostrum above front of base of premolar, 17; greatest diameter of bullae, 9.

floridanus connectens (*Lepus*), Nelson, Proc. Biol. Soc. xvii, 1904, p. 105.

ALTA MIRA COTTONTAIL.

Type locality. Chichicaxtle, State of Vera Cruz, Mexico.

Geogr. Distr. Tropical parts of eastern Mexico from southern Tamaulipas throughout the coast lowlands of the Papaloapam River in central Vera Cruz and along east slope of the Cordillera of eastern San Luis Potosi, eastern Puebla, and eastern Oaxaca, and south to Mt. Zempoaltepec.

Genl. Char. Similar to *L. floridanus*, but larger and paler. Skull longer, narrower, bullae smaller, nasals longer, more slender.

Color. Winter pelage. Top of head and back grizzled creamy ochraceous buff, washed with blackish; sides of head, body, and rump grayer; nape bright cinnamon or light cinnamon rufous, orbital area white; neck on sides and beneath dull ochraceous buff; front of fore legs and outside of hind legs cinnamon rufous; back of fore legs and front of hind legs and tops of hind feet white suffused with buff on feet and toes; tail above reddish brown; ears brownish gray, darkest at tips and narrowly edged with white.

Measurements. Total length, 442; tail vertebræ, 63; hind foot, 97; ear from notch (dried skin), 63. Skull: occipito-nasal length, 76; Hensel, 57; interorbital width, 18; parietal width, 20; length of nasals, 35; width of nasals at base, 16; greatest diameter of bullæ, 10.

floridanus chiapensis (*Lepus*), Nelson, Proc. Biol. Soc. Wash., XVII, 1904, p. 106.

CHIAPAS COTTONTAIL.

Type locality. San Cristobal, State of Chiapas, Mexico.

Geogr. Distr. Interior of State of Chiapas and Guatemala from not over 2,500 feet above sea level up to the summits of the highlands, at over 10,000 feet.

Genl. Char. Similar to *L. floridanus aztecus*, but larger and slightly darker, with legs darker rufous. Skull larger; rostrum broader and more depressed at tip.

Color. Winter pelage. Top of head and back dark grizzled ochraceous buff washed with black; sides and rump grayer; nape rusty rufous; front and sides of fore legs cinnamon rufous; back and sides of hind legs reddish chestnut; back of fore legs, front of hind legs, and tops of hind feet deep reddish buff; under side of body deep yellowish buff; the ventral surface sometimes white; sides of head spotted with buffy white; tail above dark reddish brown, blackish at tip; ears externally blackish brown, inner border paler.

Measurements. Total length, 468; tail vertebræ, 55; hind foot, 97; ear from notch (dried skin), 60. Skull: occipito-nasal length, 80; Hensel, 61; interorbital width, 18; parietal width, 26; length of nasals, 37; width of nasals, 17; depth of rostrum at front base of molars, 15; width of rostrum above same point, 19; greatest diameter of bullæ, 10.

430a. pacificus (*Lepus*), Nelson, Proc. Biol. Soc. Wash., XVII, 1904, p. 104.

ACAPULCO COTTONTAIL.

Type locality. Acapulco, State of Guerrero, Mexico.

Geogr. Distr. Pacific coast region of State of Guerrero and adjacent section of State of Oaxaca, Mexico.

Genl. Char. Similar to *L. veracrucis*, but paler and more buffy. Skull larger, heavier, especially the rostrum.

Color. Winter pelage. Upper parts, and sides of head and body dingy creamy buff grizzled with black, darkest on back; front of fore legs and feet dingy buff; sides of legs rusty buff; line on front of hind leg and on top of foot white; neck on sides and beneath deep buff; rest of under parts white, with buffy line on inguinal region; tail above rusty clay color; ears grizzled grayish brown on base darkening to narrow black tips.

Measurements. Total length, 505; tail vertebræ, 58; hind foot, 113; ear from notch (dried skin), 78. Skull: occipito-nasal length, 86; Hensel, 65; interorbital width, 19.5; parietal width, 26.5; length of nasals, 39; width of nasals at base, 16.5; width of nasals near tips, 13; width of rostrum above anterior base of molars, 19.5; greatest diameter of bullæ, 11.

436d. goldmani (*Lepus*), Nelson, Proc. Biol. Soc. Wash., xvii, 1904, p. 107.

SINALOA COTTONTAIL.

Type locality. Culiacan, State of Sinaloa, Mexico.

Geogr. Distr. Southern part of the State of Sonora to central part of the State of Sinaloa.

Genl. Char. Similar to *L. arizonæ*, but darker; bullæ smaller.

Color. Winter pelage. Upper parts creamy ochraceous buff, grizzled and washed with black; sides of head and body paler, pinkish buff; small iron gray area on rump; nape rusty rufous; neck on sides and beneath pinkish buff; rest of under parts white; front and sides of fore legs rusty ochraceous buff; back of fore legs white; sides and back of lower part of hind legs and feet rusty rufous; white line on front of hind legs and feet; tail above dark brown grizzled with buff; ears exteriorly grizzled grayish; interiorly dingy gray, tips bordered with black.

Measurements. Total length, 388; tail vertebræ, 56; hind foot, 87; ear from notch (dried skin), 66. Skull: occipito-nasal length, 66; Hensel, 52; interorbital breadth, 17; parietal width, 24; length of nasals, 27; greatest diameter of bullæ, 11.

E. *Macrotolagus*.

448a. altamiræ (*Lepus*), Nelson, Proc. Biol. Soc. Wash., xvii, 1904, p. 109.

ALTA MIRA JACK RABBIT.

Type locality. Alta Mirá, State of Tamaulipas, Mexico.

Geogr. Distr. Coast plains in southern part of the State of Tamaulipas, extreme northern part of State of Vera Cruz and eastern part of State of San Luis Potosi.

Genl. Char. Similar to *L. merriami*, but nape patch divided by median yellowish band. Skull larger and heavier, rostrum longer.

Color. Spring pelage. Top of head grizzled grayish buff; back grizzled creamy buff mottled with black; sides of body paler buff grizzled with grayish; thigh and sides of rump pale iron gray; sides of head and sides of under part of neck bright buff; nape black divided by median buff band; top of fore feet and legs dingy buff; top of hind

feet white; tail above black, this color extending in narrow line on rump; beneath grayish white; ear blackish at base, grayish white on middle, pure white on terminal portion; border on basal half buffy; remainder white to near tip, which is buffy.

Measurements. Total length, 655; tail vertebræ, 96; hind foot, 137; ear from notch (dried skin), 112. Skull: occipito-nasal length, 99; basal length, 77; length of nasals, 44; greatest interorbital width, 24; parietal breadth, 32; depth of rostrum at front base of premolar, 26; width above same point, 26; greatest diameter of bullæ, 12.

451a. *festinus* (*Lepus*), Nelson, Proc. Biol. Soc. Wash., xvii, 1904, p. 108.

HIDALGO JACK RABBIT.

Type locality. Irolo, State of Hidalgo, Mexico.

Geogr. Distr. Southeastern part of Mexican tableland in southern and eastern parts of State of Queretaro, throughout most of the State of Hidalgo, extreme northern part of State of Mexico, and Valley of Mexico, State of Tlaxcala and adjacent northern part of State of Puebla.

Genl. Char. Nearly related to *L. asellus*, ears longer; no black patch on nape.

Color. Top of head dingy grizzled buff; back buffy tinged with dull reddish brown mottled and grizzled with black; sides of body paler and grayer; thighs and rump iron gray divided on rump by black line; sides of head and neck dull buff; neck beneath dark buff; nape grizzled grayish; chin and under parts white; top of fore legs grizzled dingy buff; top of hind feet dingy white; toes grayish; tail above black, beneath dingy gray; lower half of ears grizzled yellowish gray and fringed with yellowish white hairs; terminal portion white with black patch on tip, and edge dusky.

Measurements. Total length, 575; tail vertebræ, 78; hind foot, 126; ear from notch (dried skin), 138. Skull: occipito-nasal length, 96.5; basal length, 74; length of nasals, 43; greatest interorbital width, 26.5; parietal breadth, 31; greatest diameter of bullæ, 14; width of rostrum above front base of premolars, 25.

Order XII. **Chiroptera.**

Fam. V. **Phyllostomatidae.**

Subfam. I. **Mormopinæ.**

137. Chilonycteris.

602. a.—inflata (*chilonycteris*) Rehn, Proc. Acad. Nat. Scien. Phil., 1904, p. 190.

macleani Gundl., Anales Soc. Espan. Hist. Nat., VII, 1878, Cuad. I, p. 140. (nec Gray.)

INFLATED-NOSE BAT.

Type locality. Cueva di Fari, near Pueblo Viejo, Porto Rico.

Geogr. Distr. Restricted to the Island of Porto Rico.

Genl. Char. Rostrum short, broad; braincase high; zygomata expanded.

Color. Rufous phase: above dark cinnamon; beneath wood brown; base of fur mummy brown. Brown phase: above bistre; nape and sides of neck silvery white; beneath drab, with base of fur bistre, becoming wood brown on chin and throat and whitish on the abdomen; membranes blackish.

Measurements. Total length, 63; tail, 18; forearm, 38.5; thumb, 7; third digit, 63.5; tibia, 16.5; calcaneum, 18; foot, 8.5; ear, 12.5; tragus, 4.8. Skull: total length, 15.3; interorbital width, 3.5; height of braincase, 6.4; length of palate, 6; length of mandible, 11.

602. b.—grisea (*chilonycteris*) Gosse, Nat. Sojourn in Jamaica, 1851, p. 326, pl. VI, fig. 1.

quadridens Tomes, Proc. Zoöl. Soc., 1861, p. 65. (nec Gundl.)

GRAY BAT.

Type locality. Phoenix Park, St. Ann Parish, Jamaica.

Geogr. Distr. Island of Jamaica.

Genl. Char. Similar to *C. macleani*, but with a deep emargination separating the tooth-like projections on margin of nostrils.

Color. Rufous phase: above ferruginous; beneath chestnut, palest on the chin; ears vinaceous cinnamon, pale drab apically; wing membranes mummy brown. Brown phase: above bistre, sprinkled with silvery white; beneath clove brown.

Measurements. Total length, 66.5–74; tail, 22–25; forearm, 43–44.5; thumb, 7.8; third digit, 72.5–75; tibia, 16–17; calcaneum, 20–26; foot, 9.5–10; ear, 14–16.3; tragus, 5–6.5. Skull: total length, 16.8–17; zygomatic width, 8–8.1; interorbital constriction, 3.5; palatal length, 7; length of mandible, 11.9–12.1.

602. *c.—fuliginosa (chilonycteris)* Gray, Proc. Zool. Soc., 1843, p. 20.
macleayi Peters, Monatsb. K. Preuss. Akad. Wiss. Berlin, 1872,
p. 360. (Part.) Dobson, Cat. Chirop. Brit. Mus., 1878, p.
449. (Part.)

DUSKY BAT.

Type locality. Port au Prince, Haiti.

Geogr. Distr. Island of Haiti.

Genl. Char. Smallest in size of the genus.

Color. Above cinnamon rufous; beneath seal brown; wing membranes Prout's brown; ears wood brown.

Measurements. Total length, 56.2; tail, 17-20; forearm, 35-40; thumb, 6-7; third digit, 58.5-68; tibia, 14.5-16; calcaneum, 14-16; foot, 8-9; ear, 13.2-14; tragus, 4.5. Skull: total length, 14-14.3; zygomatic width, 7.2; interorbital constriction, 3; height of brain-case, 6; palatal length, 6-6.2; width of palate and teeth, 5-5.2; length of mandible, 10-11.

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**Lepus durangæ* proves to be the same as *L. holzneri*, and therefore becomes a synonym of that species. See Allen, Bull. Am. Mus. Nat. Hist., 1904, p. 210.

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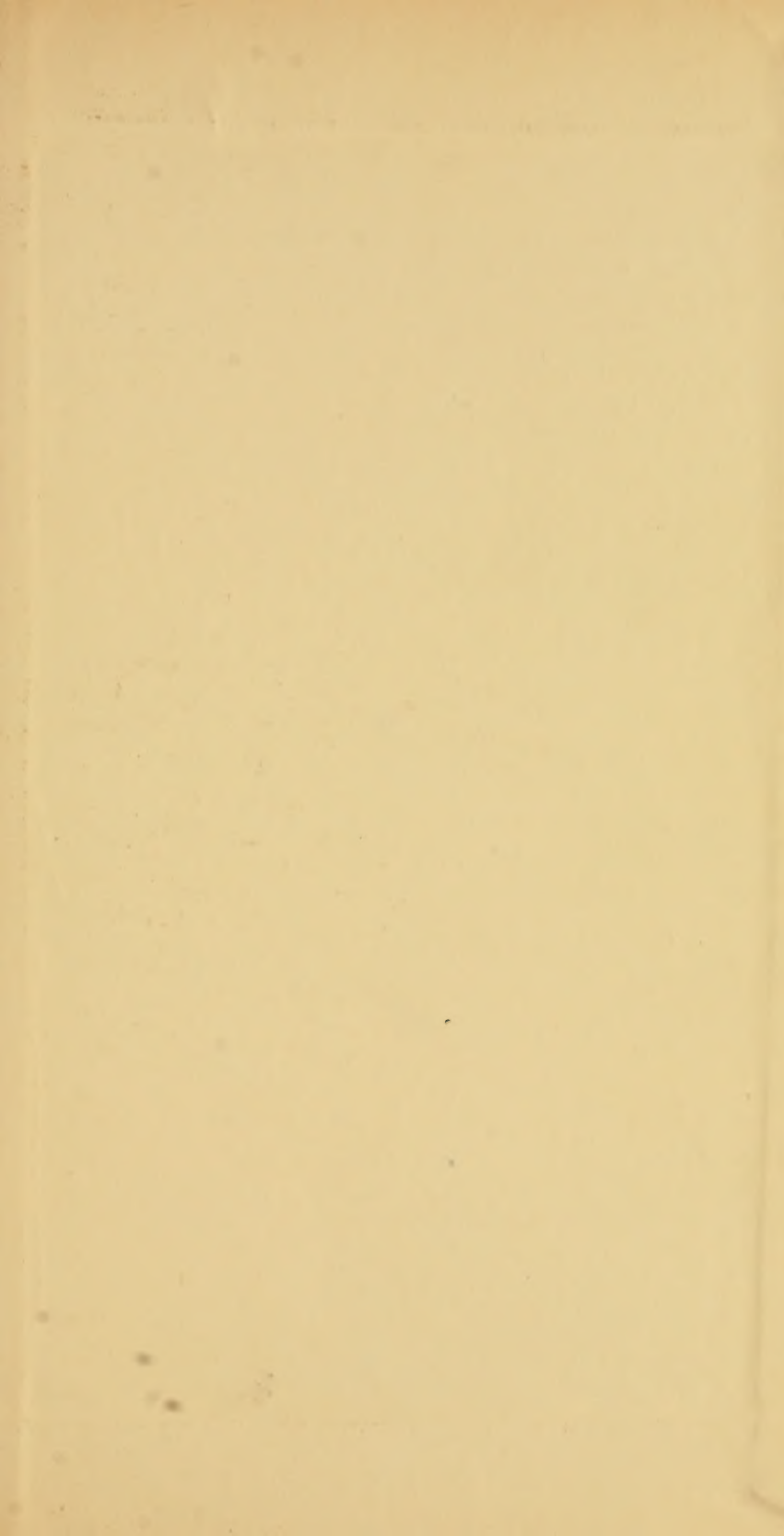
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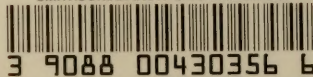
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